For Men Who Manage APRIL 1957

chemical processing

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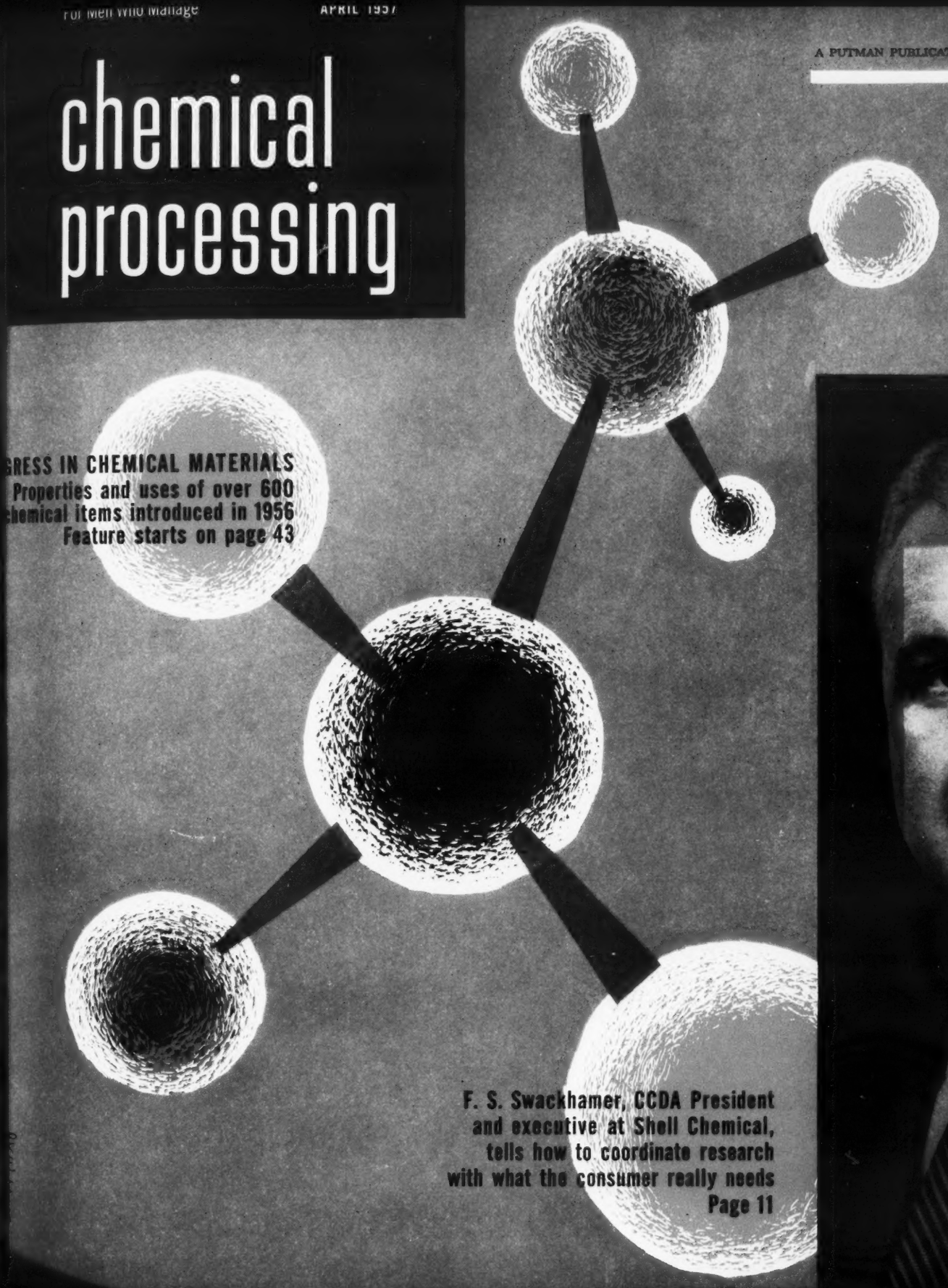

GRESS IN CHEMICAL MATERIALS
Properties and uses of over 600
chemical items introduced in 1956
Feature starts on page 43

F. S. Swackhamer, CCDA President and executive at Shell Chemical, tells how to coordinate research with what the consumer really needs
Page 11

When inquiring check 2587 opposite last page

THAT'S INTERESTING

Higher Fi for Hi-Fi

Recordings pressed on formulations containing a furnace carbon black recently introduced will not hold static electricity . . . no fuzz, no buzz from pesky dust particles that usually cling to the spinning platters. This black bonanza for woofers and tweeters gets its dust-shedding ability from an extremely low degree of electrical resistivity.

Carbon black, developed by Cabot, Boston, Mass., is just one item of more than 600 in this month's CHEMICAL PROCESSING feature, our listing of 1956 chemical developments. Look through the list, maybe there are more new items that will make your job easier. (See page 43.)

Dynel data — husbands attention

Timely booklet details essential "do's" and "don'ts" in the proper care of coats, especially those of man-made furs fabricated from Dynel acrylic fiber. Booklet, "How to Buy a Winter Coat", is published by Textile Fibers Dept., Carbide and Carbon Chemicals Co., Div. of Union Carbide and Carbon Corp., 100 E. 42nd St., New York 17, N.Y. Check 2587A on form opposite last page.

Hurricane inspector

Sit in 100 ft of water in the open sea and measure forces of waves, winds, tides, and currents during a hurricane . . . that's the job for the robot "Hurricane Inspector" being built by Gulf Oil Corporation. This will be the first sleuth, either human or electronic, to scientifically measure these forces in water depths over 100 ft.

The "Inspector" will record height of waves, period between crests, and tide during their occurrence. Wind velocities up to 100 mph will be noted by a wind velocity-wind direction indicator; a wind gust indicator handles higher values. Electric strain gages transmit data on wave and current forces from two concentric steel tube piles.

(*Please turn to page 267*)

chemical processing

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

for men who manage

Vol. 20 April 1957 No. 4

CHEMICAL PROCESSING Magazine serves American industry wherever chemicals and chemical processes are involved.

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Miscellaneous chemicals (cosmetics & toiletries, inks, insecticides, water treatment chemicals, etc.)
Paper & allied products
Petroleum, coal, coke-oven products
Rubber products
Stone, clay & glass products
Atomic energy establishments

Other industries utilizing chemicals or chemical processes

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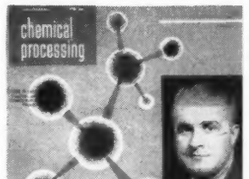
HIGHLIGHTS

chemical processing

April 1957 volume 20 number 4

THIS MONTH'S COVER



Artist's conception of molecule sets stage for this month's feature — Chemical Materials (page 43). More than 600 chemicals introduced in 1956 are indexed and described in the spotlighted section.

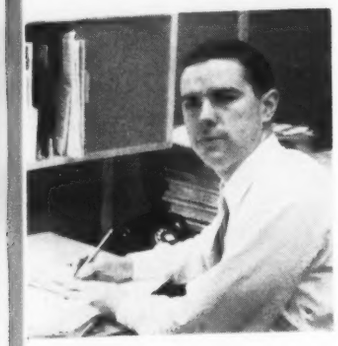
F. A. Swackhamer, President of the Commercial Chemical Development Association, who is shown on cover, tells how to coordinate these chemical discoveries with commercial needs (page 11).

REGULAR FEATURES

SPECIAL READER SERVICES

- For more information on articles and advertisements in this issue, check the Reader Service slip opp. last page
- The product directory, pages 257 to 260, is your guide to all articles and advertisements
- To subscribe to this magazine, see reader-qualification form opp. last page

over the editor's shoulder



Keeping tabs on chemicals

When we queried all chemical-making companies to find out their new developments for 1956, we came up with a compilation of 625 items. And although we divided these into two listings — commercially available and development-scale items — the compendium still looked a little unwieldy.

Since we want this sea of information to be at your fingertips whenever you need it, we did something no other magazine has done — we *indexed* all these products by their *uses*, and organized it so you can find at a glance any materials available to help solve your plant processing or product problems. This "Use-Index" will be found on page 44.

Assume, for example, that you've a problem in pigmenting a certain compound and you're wondering if there's anything new that you haven't tried.

Since all pigments developed during 1956 are indexed under *Dyes and Pigments* in the "Use-Index," you would just look under this heading on page 44, note the reference numbers given there, and flip to the corresponding product numbers in the descriptive listings (starting on page 47). If what you find interests you, you can contact the manufacturers for more details, even samples. Full company names and addresses will be found on page 94.

If *making* pigments is your business, then look under *Dyes and Pigments — Int.* for the key to what's new here . . . and follow the same procedure.

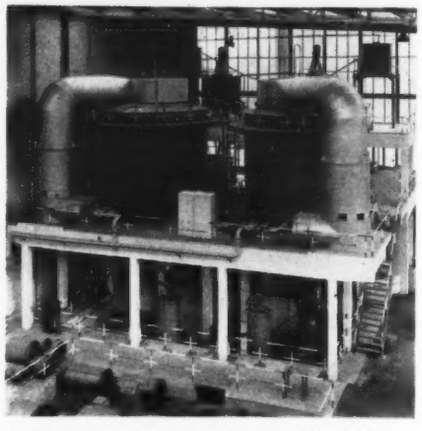
We've asked our printer to make up a limited number of reprints of this whole report. If you'd like a copy, they're available at $1 each. The price is less for quantities.

Frank E. McElroy

ASSOCIATE EDITOR

For more information on product at right, specify 2589 . . . see information request blank opposite last page.

looking ahead to next month . . .



Spray dryers are key point in pickle-solution recovery process

Recovers waste pickle solution

Possibly the answer to a problem that has plagued steel manufacturers and fabricators for years, a continuous process for regenerating waste pickle solutions has been developed in Germany and licensed to Koppers Company.

Key to the system is a spray dryer which concentrates the spent liquor to a slurry of iron sulfate crystals suspended in concentrated acid. After separating the crystals, acid is diluted and recycled back into pickling bath.

Next month's Ideas section describes the process and points up the many advantages involved.

Blending under vacuum

When gage glasses will not work because your product is too viscous, and some ingredients cannot be measured satisfactorily by displacement meters, accurate determination of weights and volume is a problem. At Pennsylvania Industrial Chemical Corp., "in still" blending was not possible with previous methods of depth and volume measurement being used there.

PICCO solved this measurement problem by using a combination of depth and specific gravity gages. Accurate, safe determination of exact weight of product in stills and quantity of material added is now handled quite easily. And reproducible blending in the stills under vacuum can now be done.

Assistant Editor Ted Wett made a trip to PICCO's Clairton, Pa., plant, talked to Chief Engineer William D. Johnston, and wrote the story that appears in May's Instrumentation and Control section.

Nuclear power — How safe?

On February 9, the switch was thrown that placed into continuous operation an experimental boiling water reactor for the generation of electric power. Looking ahead into the future when these reactors will be furnishing power to the chemical industry, CHEMICAL PROCESSING in May reports on the safety features of these reactors by describing the one at Argonne National Laboratory.

CP editor Ted Meinhold went out to Argonne and brought back the story that will appear in May's Safety section.

Getting the "bugs" out of the latex

Next month's New Solutions section tells how Goodyear Chemical division ironed the wrinkles out of its process for making synthetic butadiene/styrene latex by continuous process — the first in the country.

Big problem was foaming in the vacuum stripping of unreacted styrene and in latex concentration. This foaming caused costly shutdown for cleaning. Story relates how Goodyear solved the problem, cutting foam-overs and even improving stripping rates on some of the latices.

Here's a quick preview
of features you'll find
in May CHEMICAL PROCESSING

CHICAGO, ILL — The Materials Session of the 12th Annual Exhibit and Conference of the Reinforced Plastics Division of The Society of the Plastics Industry, Inc. Left to right: John I. Wheeler, George Lubin, Semond Levitt, Irving N. Einhorn, and Dr. Alex Sacher, with Frank W. Reinhart presiding. Panel also included Dr. Irving Skeist and Richard J. Savage, vice chairman (not shown). Over 200 attended this session, discussed new developments in materials for reinforced plastics

Report on reinforced plastics

Recent meeting of the Society of the Plastics Industry's Reinforced Plastics division brought together a panel of experts who discussed developments in the field of resins, reinforcements, fillers, core materials, and pre-impregnated materials — a 140 million pound a year business. Next month's Chemical Materials section will bring you a report on the meeting and up-to-date information on the reinforced plastics field.

Cuts tube surface needs 33 percent

Most important feature of a newly designed double-fired process heater is the fact that it produces high efficiency at a minimum cost . . . because the unit requires only two-thirds the radiant tube surface required in conventional wall-tube heaters. Principle involved is double firing of vertically suspended tube banks.

Developed jointly by Sun Oil and Alcorn Combustion Company, the units are in successful operation at Sun's Marcus Hook, Pa., refinery.

In next month's Processing Equipment section, Ralph Morrow, Assistant Process Engineer of Sun's Engineering Section, describes the unit, its uses and advantages.

"Many a good researcher is lost by placing him in administrative positions. It is the job of management to . . .

give chemists pr

DR. C. L. THOMAS
Director of Research & Development
Sun Oil Company

NOT LONG AGO, an honor student at one of our prominent eastern schools was being interviewed for a position in research. The boy had an enviable record . . . indeed, his professors were convinced that he would make an outstanding scientist. The student, however, had other ideas. Instead of taking graduate work in physics, he was intending to enter the Business Administration school so that he could move up into administrative positions rather than remain a scientist.

Don't misunderstand me . . . I am not belittling good technical administrators. They are hard to find . . . and are indispensible. Rather, I am concerned about the chemistry or engineering student working on his PhD who says, "Heaven help me if I ever turn out to be a good bench chemist; then I'll never amount to anything in industrial research!"

All of us know that research has been growing rapidly within the industry, and as it grows it has needed research leaders, group leaders, section chiefs, managers, directors, and such. At the same time, we must realize that the more the chemist advances along

THE AUTHOR

Dr. Thomas joined Universal Oil Products in 1939, where he was a moving force in the development of a highly efficient synthetic silica-alumina catalyst for petroleum cracking. He was with UOP until 1945, when he became director of research for Great Lakes Carbon Company. He joined Sun Oil in 1951 and, although his work has been largely administrative, he has played an important role in Sun's development of custom gasolines.

Dr. Thomas has been Chicago Section chairman of the ACS, vice chairman of its Petroleum Chemistry Division, and chairman of the Committee on Constitution and Bylaws. He recently was awarded the Honor Scroll Award by the Pennsylvania chapter of the American Institute of Chemists. These are his remarks when accepting the Award.

professional status

. . . while they work at what comes naturally to them."

these administrative lines, the less he deals with chemistry. The more he progresses administratively, the less he is able to use his creative ability. He has too many other urgent problems that crowd out his creative thinking.

Of course, the industrial management system has been responsible for this. A title, with people working for you, means "status." More people, more status . . . and still less chemistry. And every administrator in industry can tell about losing a good chemist and gaining a poor administrator by promoting him.

In their desire for recognition, all chemists seek "professional status." And when we try to help the chemist get this recognition, what have we been doing? We suggest that he take part in civic affairs, get on the school board, give luncheon talks on the importance of the industry and chemistry in general, maybe be a Boy Scout leader, even write "letters to the editor", pointing out chemical errors in the press.

I needn't point out that these activities aren't natural

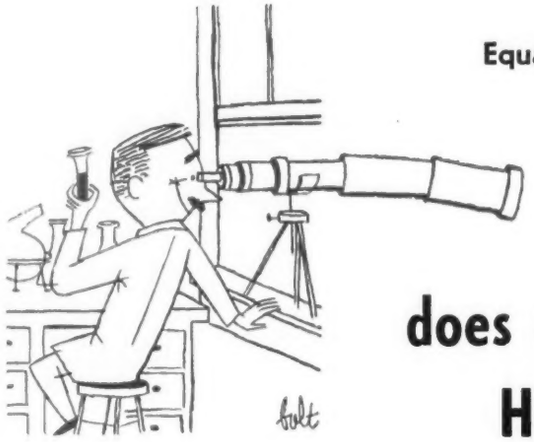
(*Please turn to page* 253)

Mr. F. S. Swackhamer joined Shell Chemical Corporation in 1948 as senior technologist. Two years later, he rose to manager of the resins and plastics department. This year he was named manager of sales development for all chemicals sold by the Chemical Sales Division of Shell.

Mr. Swackhamer earned a master's degree in organic chemistry at Polytechnic Institute of Brooklyn. He received his bachelor's degree in chemistry from Rutgers.

Do new scientific discoveries alone guarantee greater sales?

Equally important with scientific discovery is the answer to this question –



What products does the consumer need now? Here's how to find out

F. S. SWACKHAMER
President, Commercial Chemical Development Association
Manager, Sales Development Department
Chemical Sales Division, Shell Chemical Corporation

In the past two decades the orientation of our chemical industry has swung more and more toward the laboratory. And with this shift, we have somehow begun to lose sight of a very important man . . . the consumer.

We are developing this blind spot probably by a misinterpretation of the function of research. We think of a new scientific discovery as a guarantee of increased sales. We are inclined to forget that a new product, after it has passed all the tests of laboratory and production, still faces the hardest test of all . . . is it something the consumer needs now? If it cannot pass this test, it is a failure commercially, regardless of how startling was the discovery that gave it birth.

The misconception of the role of the consumer is not something new to business. Fifty years ago businessmen believed that the customer could be made to buy whatever their plants could produce. Today we paraphrase that attitude — only we substitute "laboratories" for "plants".

Both attitudes are too self-centered to be constructive. At their core is the belief that business is determined by the producer . . . not by the consumer. When we stop and think about it, we all know that these attitudes are unsound. We all recognize that a company's growth must come from the outside . . . from a consumer who puts cash on the barrel head for a product he needs. Remember: "He who pays the fiddler, calls the tune."

These misconceptions also dissipate the effectiveness of the research scientist. Working in a laboratory far removed from the consumer, he cannot be expected to anticipate the problems that the consumer finds in his every-day work. The problem of the consumer — what he needs, wants, sees, and thinks — must be reflected back to the laboratory. This is a job for the commercial development man.

How To Do It

How do we accomplish this task? First, we have to find which of the consumer's wants shows the most promise from a research standpoint. In other words, what new product will open up the most fertile market?

We can accomplish this task by finding the answers to these four objectives:

(*Please turn to bottom page* 253)

THE BIG CHANGE AT LILLY PH

The biggest hurdle of the changeover was the conversion or replacement of all dispensing equipment, scales, balances, and other measuring devices. Edward V. Meith (left), Instrument Department supervisor, and James E. Steep, weights and measures operator, are shown recalibrating a 30-kg scale

RALPH W. ERNSBERGER is chairman of the committee which planned and supervised Lilly's conversion to the metric system.

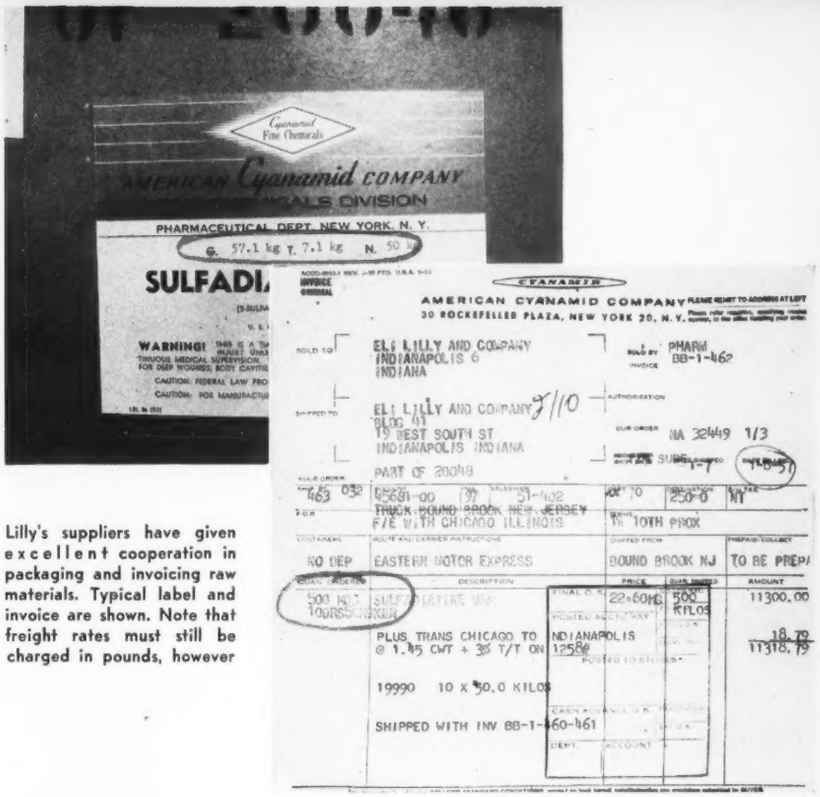
As head of the Pharmaceutical Development Department, Ernsberger has been responsible for over 2500 pharmaceutical manufacturing formulas. The changeover to the metric system has alone decreased the work of revising, maintaining, and costing these formulas by about 20%.

A native of Ohio, Ernsberger received his BS in chemistry in 1939 from Otterbein College, Westerville, Ohio. He obtained a MS degree in chemical engineering from Ohio State University, subsequently joining Carbide and Carbon Chemicals Corp. He came with Lilly in 1946, and in 1951 became head of the Pharmaceutical Development Department.

One of the key men behind Eli Lilly's changeover to the metric system tells why—

and also gives us an interesting look into the future

by **RALPH W. ERNSBERGER**
Head of Pharmaceutical Development Department
and Chairman of the Metric Committee
Eli Lilly and Company, Indianapolis, Indiana



Lilly's suppliers have given excellent cooperation in packaging and invoicing raw materials. Typical label and invoice are shown. Note that freight rates must still be charged in pounds, however

Our company converted to the metric system of weights and measures for a very practical reason — to save money.

For many years, in its internal operations our company had used a complex system involving avoirdupois, US volumetric, apothecaries', and metric units. More than 1500 different raw materials were ordered, received, recorded, weighed, and accounted for in one or more of these four systems.

Duplicate equipment was needed in many instances, and employes were required to operate in any one or all of the above systems. There were many opportunities for inadvertent errors in specifying quantities, keeping records, and handling materials. The cost of checking and double-checking to prevent such errors, the duplication of effort, the repeated work, and reconciliation of accounts undoubtedly added many dollars to the cost of doing business.

How This Multiplicity of Systems Came About

In the early days of the pharmaceutical industry, the apothecaries' system of weights and measures was established to provide a fractional measure for dosage requirements. Later, the avoirdupois system was combined with apothecaries' units to express large quantities in units of lesser denomination. The transition to the metric system began two or three decades ago, when vitamins were introduced, and metric units were superimposed on the already existing avoirdupois-apothecaries' systems.

Vitamins were developed by scientists who were, perhaps, closer to the chemicals end of the trade than to the strictly pharmaceutical side. They were accustomed to thinking in metric terms. As vitamins became a household word throughout the country, great quantities of raw materials moved in the metric system from the fine chemicals producers to the pharmaceutical manufacturers.

Vitamins were followed by antibiotics. When Sir Alexander Fleming first developed penicillin, his product was so impure that it was not possible to establish a uniform dosage on the basis of a weighed quantity. Therefore, an arbitrary system of international units was established to specify the potency of penicillin. The purity of penicillin soon reached the point where it was possible to specify the absolute potency of the antibiotic in terms of units per milligram. As producers became more skilled in fermentation processes and the purity of the product increased, penicillin yields and the record-keeping associated with it were expressed on a weight basis. When weight units were established, it was a natural step to adopt the metric system for penicillin.

With the advent of today's broad-spectrum antibiotics, purity was established at a high level before marketing began; and from the very beginning, dosages were expressed in metric units.

Dosages of the newer drugs — such as the steroid compounds, cortisone, and ACTH — have been universally expressed in metric units. The pharmaceutical manufacturer produces the drug in metric units, the physician prescribes the medicine in metric units, and the patient has come to recognize that he is taking a quantity of drug measured in metric units.

Groundwork to Simplification is Laid

This evolution of dosage forms from the apothecaries' weight to the metric had so complicated Eli Lilly and Company's internal operations that it was necessary to manipulate figures, records, and accounting procedures in several systems of measurement. Additional personnel was required for the tedious mathematical conversions needed to conduct business in all of these systems.

The idea of adopting the metric system at Lilly originated soon after World War II with the late

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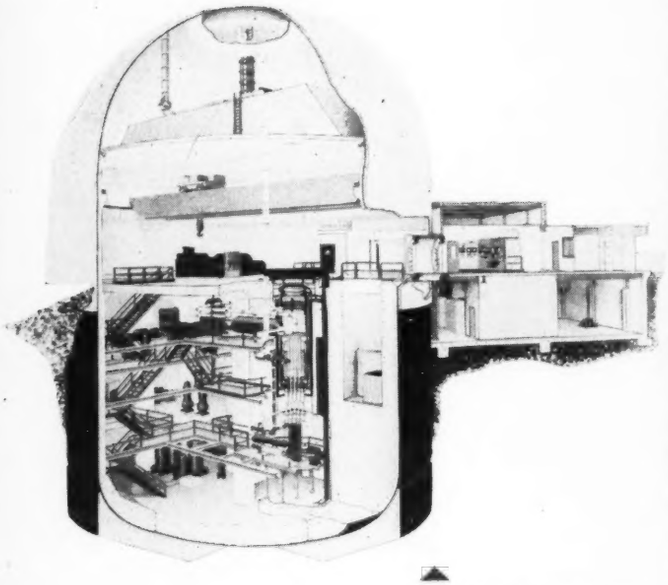
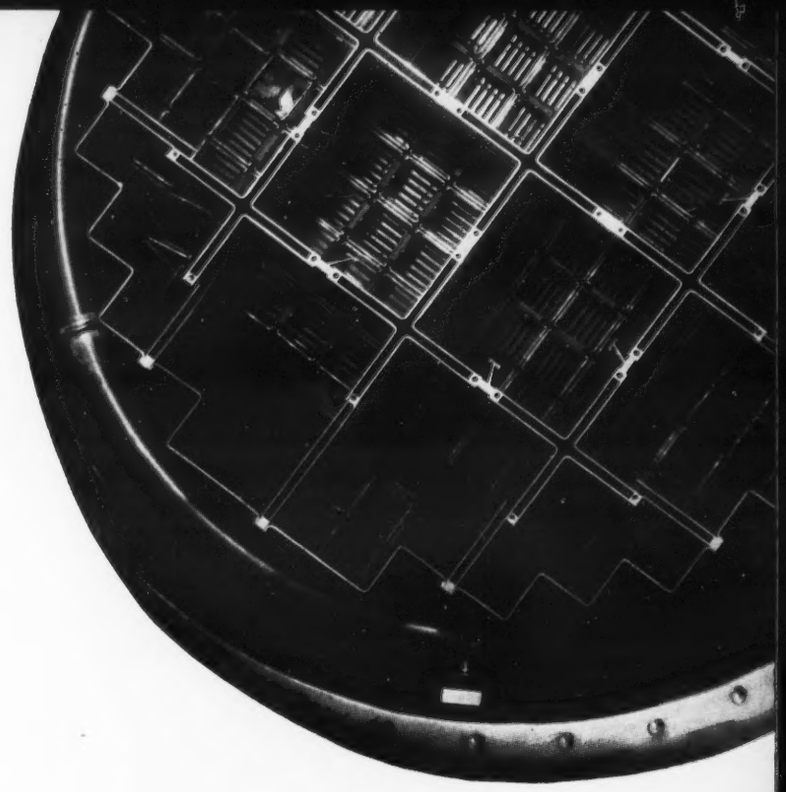


To safeguard against contamination of surrounding atmosphere in case of an accident, the entire power plant building is enveloped within an air-tight, welded steel shell, 80' in diam x 119' high

The nine control rods of Argonne's EBWR are driven by these mechanisms under reactor



View of a portion of the 114 fuel assemblies inside reactor. Photo was taken during the critical fuel loading operation prior to start-up

The switch has been thrown on the first nuclear power system in the US. Of historic significance in the development of atoms for peace . . .

ARGONNE LIGHTS UP WITH THE ATOM

TED F. MEINHOLD, Associate Editor

The first nuclear power system in the US designed and built solely for experimentation in the generation of electric power is now in continuous operation at Argonne National Laboratory, Lemont, Illinois. Designated the EBWR (Experimental Boiling Water Reactor), it produces 5000 kw of electricity from 20,000 kw of reactor heat in the form of 600 psig steam. The electricity produced is enough to meet the major portion of the laboratory's electricity requirements.

The reactor first went critical on December 1, 1956, and operated briefly at full power on December 29. It went into continuous full-power operation on February 9, 1957.

Reactor

The EBWR is a complete, direct-cycle, boiling water reactor power plant. Steam is generated within the reactor vessel and piped directly to a turbine without intermediate heat exchangers. Reactor consists of a 7′-diam x 31′-high steel pressure vessel having walls 2⅜″ thick. Reactor core, about 4′ in diam, consists of 114 zirconium-clad uranium fuel assemblies, of which 106 contain enriched (1.44% U^{235}) uranium, and 8 contain normal uranium. There is a total of 6.1 tons of uranium in the core. Each fuel assembly is 77⅝″ long x 3¾″ square.

Nine control rods are used in the reactor. Hafnium is the neutron-absorbing metal in five of the rods. The other four are made from stainless steel containing 2% boron. The hafnium rods are 1/16″-thick sheet metal bent into angles and spot welded together to form cross-shaped sections 10″ x 10″ x ⅛″ thick. End fittings are of stainless steel. Upper 46″ of rod are hafnium, middle 58″ are Zircaloy-2, and lower 71″ are stainless. Rod weighs 97 lb. The boron rod has essentially the same dimensions, except that it is ¼″ thick and weighs 141 lb.

Operation

Cold deionized feed water at 110°F is pumped into the reactor vessel, where it is raised to 488°F at 600 psig. At 20 mw core power, steam generation rate is 60,600 lb/hr, which is reduced to 60,000 lb/hr with the reactor water purification system working; about 150 kw heat is rejected by the purification system. About 35% of the heat of fission is expended in raising the cold feed water to saturation conditions at 488°F, and the remaining 65% forms steam. Steam rises to the collection ring at rate of 0.39 fps, and is fed, at 600 psig, to a turbine-generator set of conventional design, except for special shaft seals and moisture eliminators.

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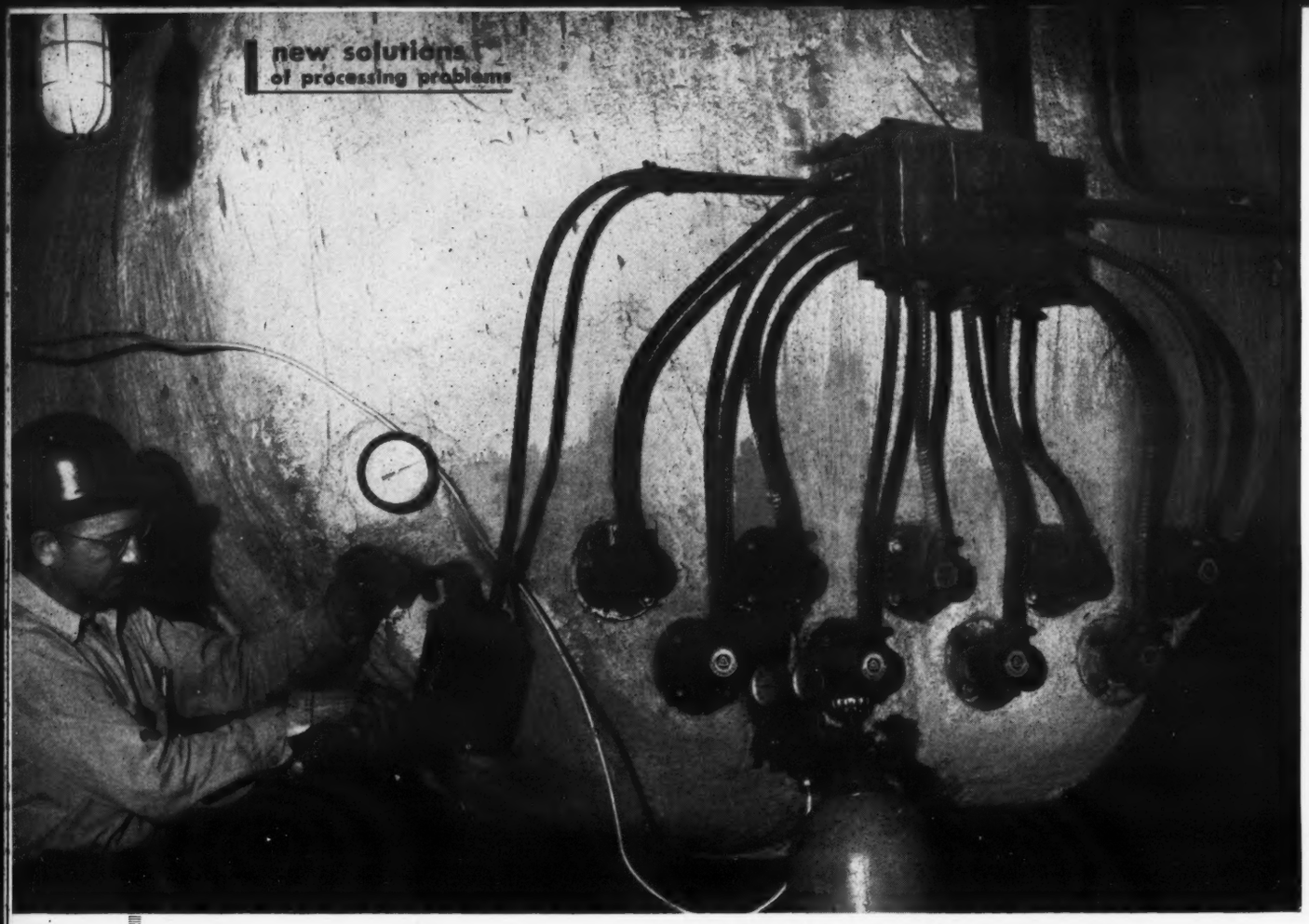


End point of distillation is checked by drawing sample and checking softening point. Heads of immersion heaters, which provide easily controlled temperatures up to 250°C, are at bottom of still

Because pressures were too high when heating with steam, and load too fluctuating for hot oil to be practical, Pennsylvania Industrial Chemical Corp. turned to . . .

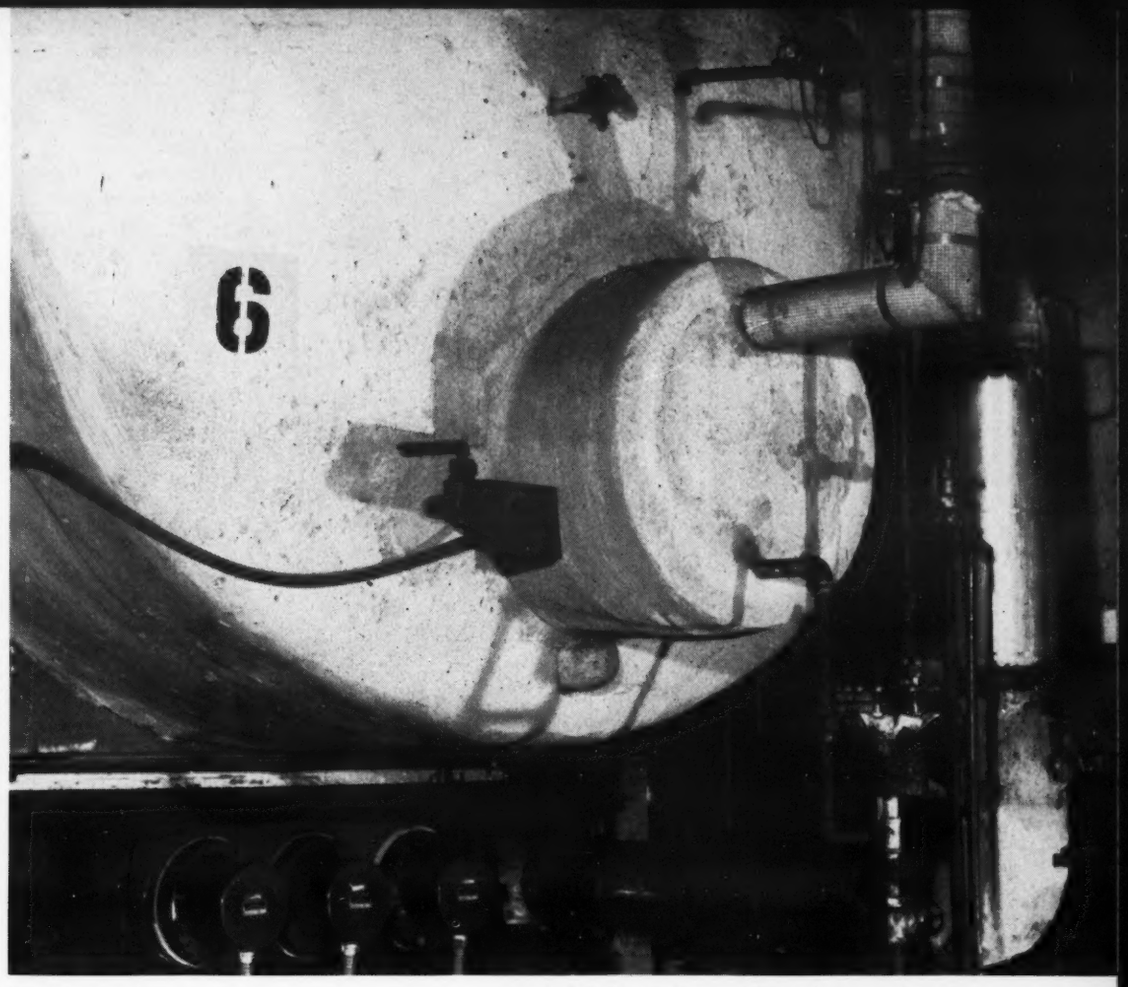
immersion heaters for accurate control of resin distillation at 250°C

THEODORE W. WETT, Assistant Editor
With **WILLIAM D. JOHNSTON Jr.,** Chief Engineer
Pennsylvania Industrial Chemical Corp.
Clairton, Pa.

Problem: Temperatures required to distill coumarone-indene-type resins at Pennsylvania Industrial Chemical necessitated a steam pressure of over 400 psi. Company considered a hot oil circulating system for this operation so that pressures could be reduced. However, because load fluctuated considerably during operation, this system was not practical. Conventional immersion heaters were tried but units installed had too high a wattage density and caused undesirable localized

Stills are equipped with from 90 to 180 kw of immersion heating. Unity power factor of heaters raises overall plant power factor so that is consistently between 0.90 and 0.95

Photos by CP Staff



External circulation heaters below still were used to increase distillation capacity. By adding 90 kw by this method to existing 90 kw on a still, company doubled still's capacity

overheating. Heaters coked badly, and efficiency dropped as deposits built up on heating surfaces.

Resins are prepared by catalyzing a mixture, such as coumarone and indene obtained from petroleum fraction boiling between 120-200°C, in a solvent matrix. Mixture is then distilled to remove non-reactives including saturates, aromatics, and solvent. Solvent is a mixture of aromatic hydrocarbons boiling between 100 and 300°C. Distillation temperatures run up to 250°C under a 26" vacuum.

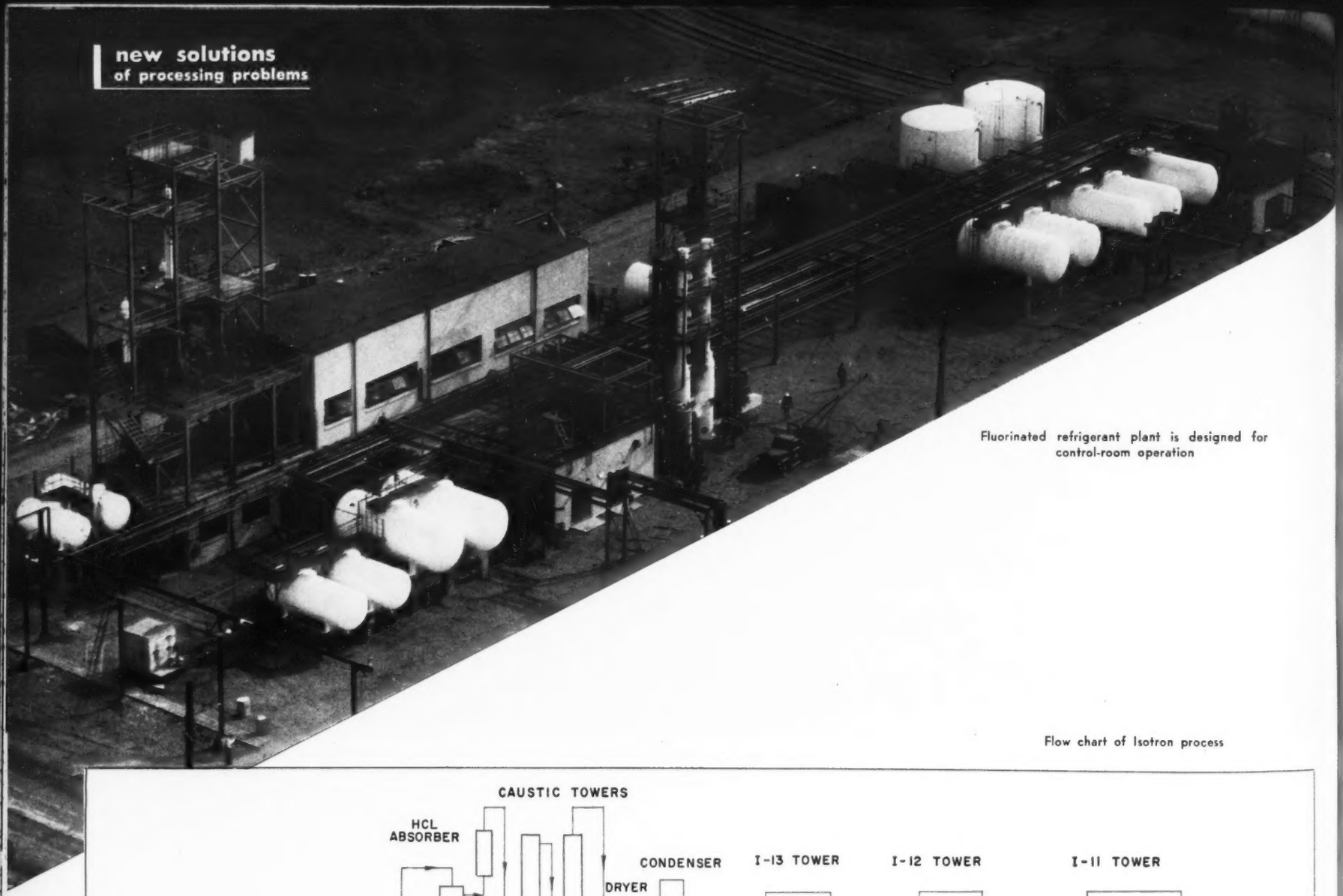
Batch charge ranges from 35,000 to 85,000 lb. Weight is reduced about 50% during distillation. End point is determined by drawing sample through an electrically heated valve and checking softening point. Final product is sent to storage or flaking machine. It is permanently thermoplastic and finds application in protective coatings, flooring (asphalt tile binder), and adhesives.

Solution: About five years ago Pennsylvania Industrial Chemical installed approximately 1000 kw of Chromalox electric immersion heating units on eight resin stills. Individual stills have from 90 to 180 kw of heating capacity. Units are 5 kw each, have a steel protective sheath, and operate on 460 volts with a wattage density of 14 watts per square inch. Heated blade length is approximately 40 inches. Heaters enter horizontal cylindircal stills either through side or end. Still charge is raised to 160°C with steam coils and then to required 250°C with immersion heaters.

Results: High operating temperatures are obtained without the need for high pressures. Cost of installation was relatively low, and heat can be controlled easily to accommodate fluctuating load. When it became necessary to expand capacity of distillation equipment, company used 18 kw external circulation heaters to provide additional heating. In these units steel-sheathed immersion elements are mounted in a welded steel pipe chamber. Resin is pumped through heating chambers. Adding 90 kw of external heat to 90 kw originally installed more than doubled a still's capacity.

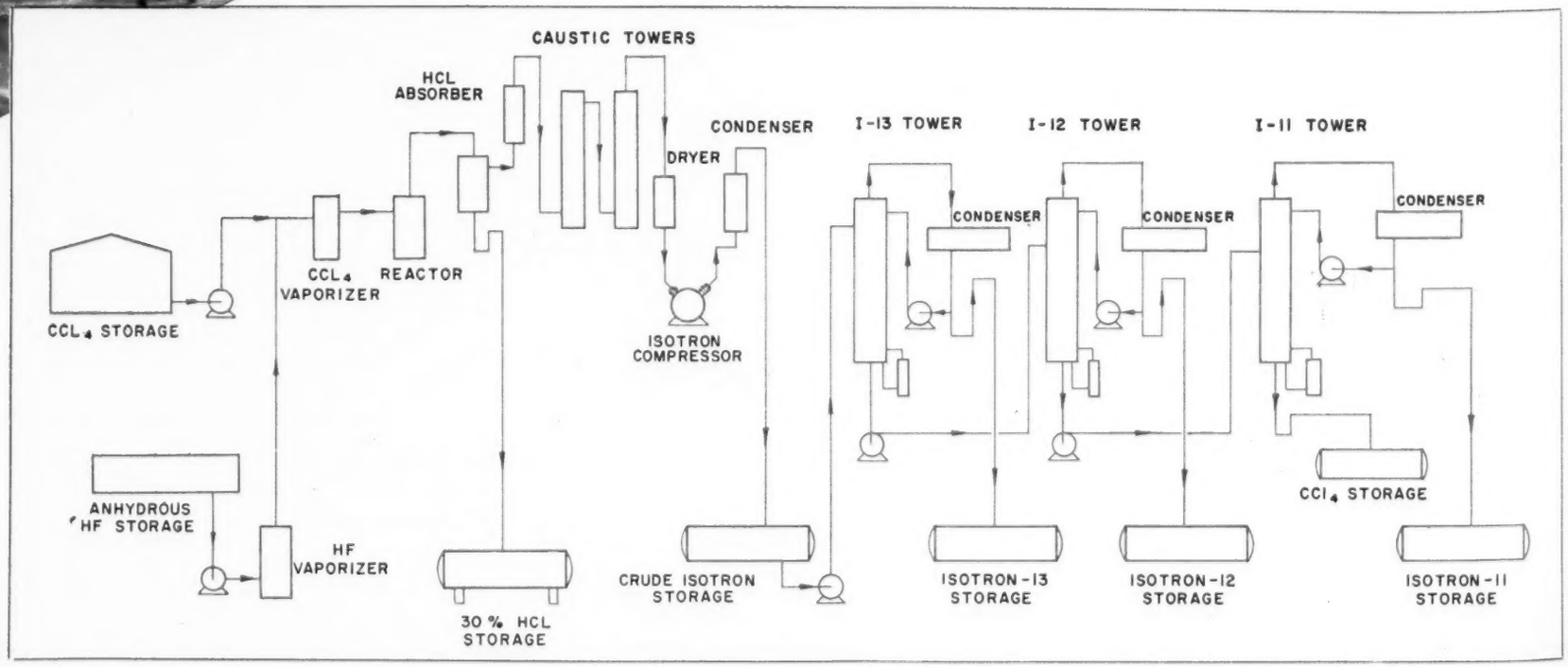
A plus feature of this electrical heating installation is an improved plant power factor. Unity power factor of heaters raised overall plant factor so that it is consistently between 0.90 and 0.95.

(Chromalox electric immersion heaters are a product of Edwin L. Wiegand Co., Dept. CP, 7500 Thomas Blvd., Pittsburgh 8, Pa. . . . or for more information check 2595 opposite last page.)



Fluorinated refrigerant plant is designed for control-room operation

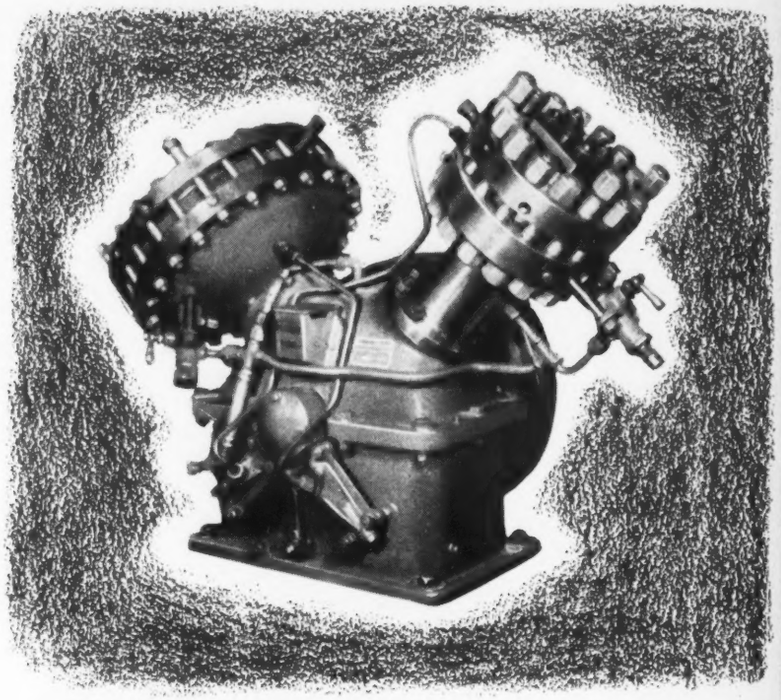
Flow chart of Isotron process



High yields of high-purity product, without high pressures or corrosive conditions, are attained by Pennsalt's French process, which also furnishes—

flexibility in manufacturing fluorinated refrigerants

GORDON WEYERMULLER, Associate Editor
With **E. V. WINSLOW,** Project Manager
Pennsalt Chemicals Co., Calvert City, Ky.



Metal-diaphragm compressor helps eliminate contamination and product leakage

Pennsalt had several reasons for choosing the French Electro-Chimie process* for its new plant for manufacturing fluorinated refrigerants. Degree of fluorination can be varied easily so that different types of refrigerants can be produced in varying quantities, according to market demand. Also, reactors do not operate at high pressures or under severely corrosive conditions. The continuous process makes a high-purity product (reagent grade) on a commerical scale. Yields have been high.

Plant, which went on stream at Calvert City on October 24, 1956, is presently producing Isotron 11 (CCl_3F) and 12 (CCl_2F_2), along with small quantities of 13 ($CClF_3$). Majority of production consists of 12. These products are used in the refrigerant and aerosol fields. Specifications for refrigerant use, which are most stringent, follow:

	I-11	I-12
H_2O (ppm wt)	10 max	10 max
Boiling pt, °F	+74.8	−21.8
Residue on boiling to dryness (%)	0.01 max	0.01 max
Acid	Nil	Nil

So far, product has contained only about 5 ppm H_2O. Flexibility in changing ratio of 11 to 12 produced has been excellent.

*Societe d'Electro-Chimie d'Electro-Metallurgie et des Acieries Electriques d'Ugine — Paris, France

Basic raw materials for process are hydrofluoric acid and carbon tetrachloride. HF is manufactured at Calvert City by Pennsalt from fluorspar obtained from company's mines in the area. CCl_4 is purchased and stored under slight pressure. These materials are mixed and preheated to reaction temperatures. Mixture passes to catalytic converters, which operate at low pressures and moderately high temperatures. Following reactions can take place, depending on controls and ratio of ingredients introduced:

$$HF + CCl_4 \rightarrow CCl_3F \text{ (Isotron-11)} + HCl$$
$$2HF + CCl_4 \rightarrow CCl_2F_2 \text{ (Isotron-12)} + 2HCl$$
$$3HF + CCl_4 \rightarrow CClF_3 \text{ (Isotron-13)} + 3HCl$$

Gases from reaction go to HCl absorber, which is a standard Karbate falling-film and tails tower absorbing unit. Here 30-36% HCl is recovered. Gases then pass to caustic scrubbers, which remove trace impurities of acid. In next step, gases go through a dual-type activated-alumina dryer.

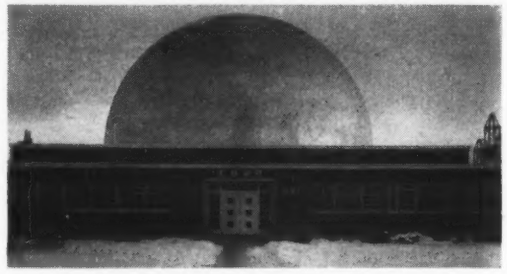
After drying, gases pass to two French-design Corblin compressors. These metal-diaphragm units avoid oil contamination of product or leakage of product gases. Units are constructed so that metal diaphragm is between lubricating oil and product gases. No leakage of product can occur through shaft. In these compressors, pressure of gases is increased from atmospheric to 150-200 psi in one stage. Crude product is stored at this pressure.

Crude is distilled to separate the different types of the refrigerant. Distillation system contains three columns, one for each product being

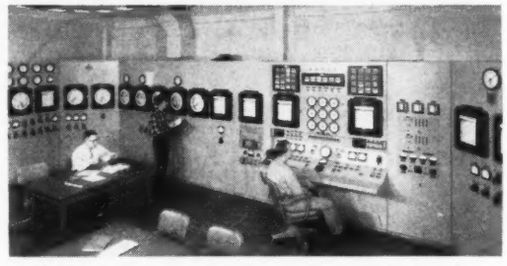
(*Please turn to page* 21)

First Nuclear Power System

(*Continued from page* 15)



Front view of EBWR installation at Argonne National Laboratory



Entire plant is operated by remote control from this room, which is separated from power-plant building by double-door air-lock

Water purity is maintained by ion exchangers and filters. Steam leakage is designed to be less than a pound of steam per day out of the overall system. Entire EBWR facility — steam plant as well as reactor — is operated by remote control. This includes an intricate system of instruments, alarm signals, and control mechanisms. All communication elements are located in control room outside power plant building.

Air-tight Steel Containment Shell

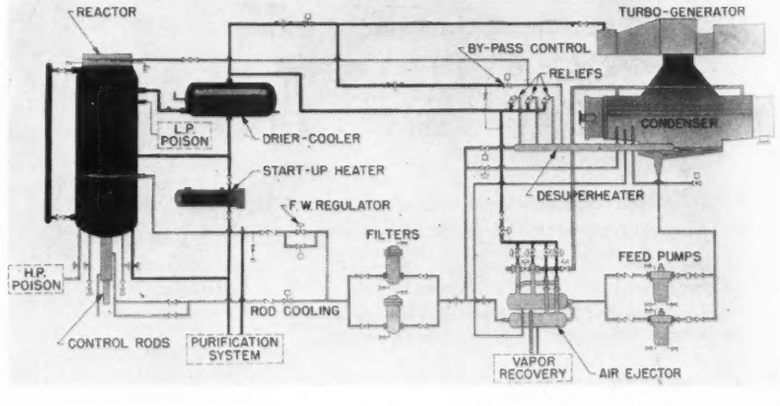
To safeguard against contamination of surrounding atmosphere in case of an accident, the entire power plant building is enveloped within an air-tight, welded steel shell, 80′ in diam x 119′ high. Approximately half of the building is constructed below grade. Shell withstands 15 psig internal pressure, with leakage less than 100 cu ft per 24 hr.

Economics and Future Plans

The EBWR will use an estimated six lb of nuclear fuel a year. Cost of current generated will be between 30 and 35 mils per kwh, compared to 12 to 15 mils for conventional steam-powered plants. Reactor is designed to handle both light-water and heavy-water systems. Plans have been made to test a heavy-water core in the EBWR in 1958. This core will be designed to operate primarily with forced circulation. It is hoped to reduce cost of nuclear power to 20 mils per kwh.

The experimental plant will be used by the laboratory to further their studies of boiling water reactors and evaluate their possibilities for large-scale application. Based on data already obtained from past studies, the Commonwealth Edison Company of Chicago, with a group of associated companies, is planning a boiling water reactor plant at Dresden, Illinois, which will produce 180,000 kw of electricity. Plant is scheduled to be completed in 1960.

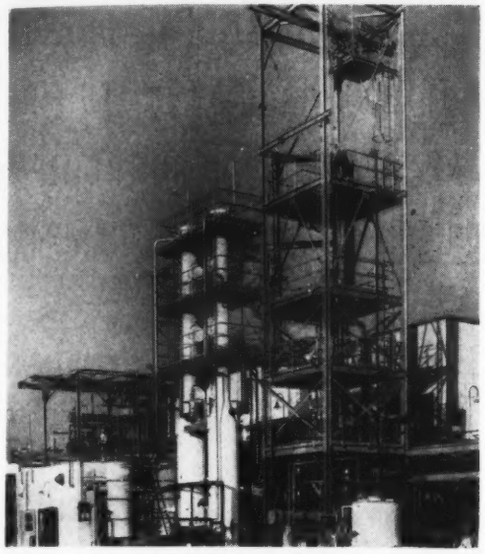
(EBWR reactor was developed by Argonne National Laboratory, Dept. CP, P.O. Box 299, Lemont, Illinois. The laboratory, operated by the University of Chicago for the Atomic Energy Commission, also designed and fabricated the reactor core and provided technical supervision for the overall project.)



Steam generated in reactor passes directly to turbine generator, eliminating need for intermediate heat exchangers or regulators. Boric acid poison systems can be used for emergency shutdown

Fluorinated Refrigerants

(*Continued from page 19*)



HCl is removed from product gases by Karbate absorber

made. Columns are packed with Raschig rings. Standard condenser reflux system and vertical thermosyphon reboilers are used.

Distillation system is completely instrumented for automatic operation. Only two men per shift are required for operation of entire plant.

Other features of plant that permit control-room operation are 20 hermetically sealed pumps and special refrigeration valves to eliminate contamination and leakage in distillation system. Product is monitored for purity with an infrared analyzer.

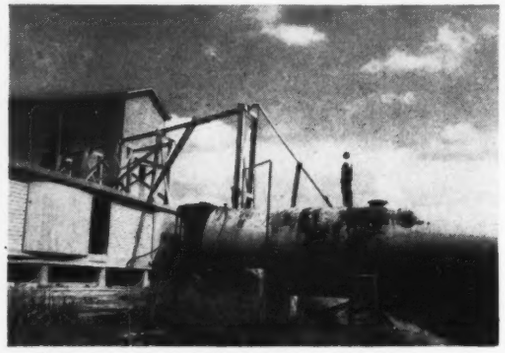
Pennsalt is building another new plant at Calvert City, which will make the 22 series and the 114 series of refrigerants. Company may also go into other fluorinated hydrocarbons.

(For further information on Isotron fluorinated refrigerants contact Pennsalt Chemicals Co., Three Penn Center Plaza, Dept. CP, Philadelphia 2, Pa. . . . or check 2598 on form opposite last page.)

No maintenance on PVC pipe handling 77-79% sulfuric at fertilizer plant . . .

previous iron pipe replaced twice every year

Problem: Iron pipe used to carry 77-79% sulfuric acid at a fertilizer plant had to be replaced twice yearly. Pipe was installed at Plant Food Division, Cotton Producers Association in Carrollton, Georgia. Plant makes a complete line of



PVC pipe runs from large sulfuric acid storage tank on outside to small tank on interior of the building

superphosphate fertilizers, using sulfuric acid, water, and concentrated rock dust. Pipe was used to carry the sulfuric acid from a large storage tank on the outside to a small tank inside a plant building.

Solution: In July 1955, plant replaced the iron pipe with one made from rigid polyvinyl chloride. PVC pipe is 75′ long and 2″ in diameter.

Results: Since PVC pipe was installed, no maintenance has been necessary. Plant feels that the installation is permanent.

(Koroseal rigid polyvinyl chloride pipe is product of B. F. Goodrich Industrial Products Company, Dept. CP, Marietta, Ohio . . . or for more information check 2600 on form opposite last page.)

Solution leakage stopped by using graphite dispersion

Problem: Cyanide zinc plating solution persisted in leaking from threaded pipe joints in plating solution filtration system and lines leading to plating room at Superior Manufacturing Co., Albert City, Iowa. As solution evaporated on pipes, unsightly cyanide salt deposits formed. Cyanide-containing deposits could be fatal if accidentally ingested and even skin contact could have serious effects.

Company, over a period of 15 years, had tried

numerous pipe-joint cements including litharge and glycerine. None were able to eliminate leakage problem. Crusty, poisonous deposits were difficult to remove and housekeeping costs mounted.

Solution: In mid-1955 Superior used a paste of semi-colloidal graphite dispersed in petroleum oil to seal pipe joints. Material was brushed on joints during assembly. Graphite is electric-furnace material processed to microscopic size and dispersed. Compound is ready for use directly from container.

Results: Maintenance personnel found that threads could be drawn tighter with less effort. After a year, joints are still tight. There is no sign of leakage or disintegration. Compound does not react with acids or alkalis and retains lubricating ability which permits easy separation of pipe joints when required.

('Dag' Dispersion No. 204 was supplied by Acheson Colloids Co., Dept. CP, Port Huron, Mich. . . . . or for more information check 2602 on the convenient Reader Service slip which is located opposite last page.)

Plant-run plan available for testing aluminum silicate pigments in adhesives

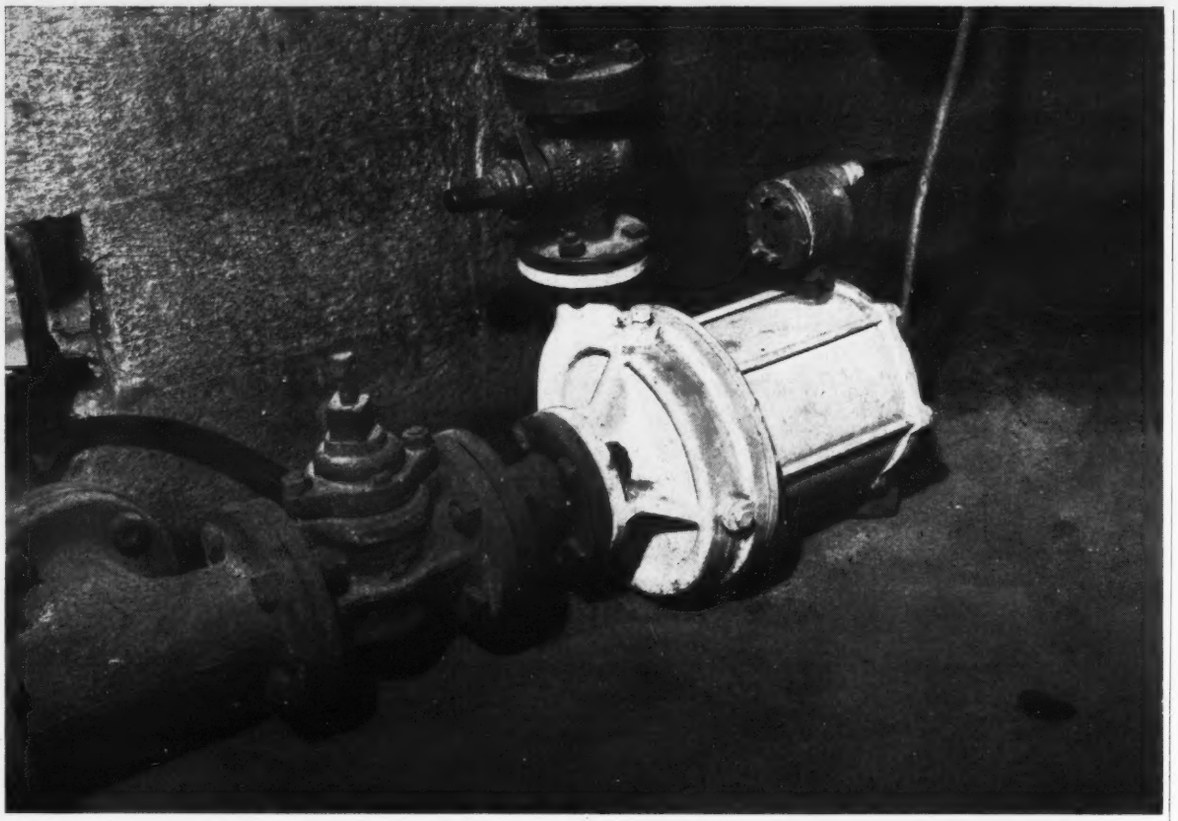
Manufacturers of corrugated board, laminated solid board, fiber cores and tubes, and similar paper products are now able to test aluminum silicate pigment additives in their adhesive formulations in their own plant, without upsetting normal production schedules. The tests are made on the paper converters' own equipment, without cost or obligation to the converter.

Under the plant-run plan, the manufacturer can: 1) Test new adhesive formulas, 2) obtain the services of an aluminum silicate pigment adhesive specialist, and 3) have aluminum silicate pigment material process-engineered to fit his operations — in sufficient quantities on a cost-free basis for the plant-run tests.

Runs of both the regular adhesive and the improved formula are made during the test. Samples of both products are compared for wrap, washboarding, stiffness, dryness, adhesion, strength and other properties.

When scheduling the service, paper converters are requested to supply their present adhesive formula. Where indicated, the laboratory prepares a revised formula using aluminum silicate pigment additives. This new formula is then laboratory tested to assure maximum possible improvement.

(Further information on the test plan can be obtained by writing to Minerals & Chemicals Corporation of America, Plant-Run Plan Scheduling, Dept. CP, Essex Turnpike, Menlo Park, New Jersey.)



Chempump solves leakage problem

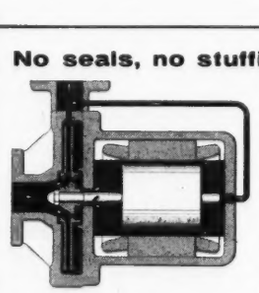
handling carbon tetrachloride at chlorinated products plant

Carbon tetrachloride is tough to handle. It's "slippery", and has a way of oozing through even the best seals and packing. At this major chemical company's chlorinated products plant, conventional centrifugals were used to pump carbon tetrachloride from storage tanks to drums and tank cars. Stuffing box leakage was a persistent problem. Maintenance and downtime costs ran high.

Like many other chemical processors, this company uses *Chempump* to tame hard-to-handle fluids. Since replacement of the conventional centrifugals with two *Chempumps*, leakage has ceased to be a problem. The only maintenance required on the pumps, now well into their second year of service, has been a precautionary change of bearings. External lubrication is eliminated—bearings are constantly lubricated by the pumped fluid itself.

There's a good chance that *Chempump's* many unique advantages can be profitably applied in your own processing operations. For details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.

No seals, no stuffing box, no leakage



Chempump combines pump and motor in a single leakproof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump

First in the field...process proved

Monel baskets have stood up well against heat and moisture in the autoclaves used to sterilize filled ampoules

Containers for handling vaccine ampoules during autoclaving take quite a beating. In looking for something more substantial, Eli Lilly came up with . . .

Problem: Effective and economical sterilization of certain pharmaceutical products, not only depends upon autoclaving conditions, but also upon methods of handling the products in and out of the autoclave. Eli Lilly and Company, in Indianapolis, Indiana, was particularly concerned about this part of the operation. Conventional containers used for holding filled ampoules during autoclaving suffer quite a bit when subjected to the high-temperature wet heat. Conditions are ripe for corrosion. Continuous handling calls for strong construction to avoid frequent maintenance.

Solution: Lilly's investigation into various types and forms of containers finally led them to purchase perforated 24-gage Monel alloy sheets and make them into sterilizing baskets.

Resulting baskets measure 9x12x5 inches and

When inquiring check 2603 opposite last page

Baskets' size and sturdiness make them satisfactory tote containers for transferring polio vaccine ampoules from filling to sorting areas

sterilization baskets of perforated Monel sheet

have staggered perforations, 1/13 inches in diameter with centers 1/8 inches apart, on top, bottom, and sides.

Results: Baskets have worked out very well. The 32% open area given by the perforations allows steam or hot water to circulate freely around ampoules, permitting uniform sterilization.

Sturdiness of construction and corrosion-resistance of the metal have reduced maintenance to a minimum. These properties have resulted in the baskets finding extra duty in the company's polio vaccine manufacturing program. They are being used as tote containers for polio vaccine ampoules.

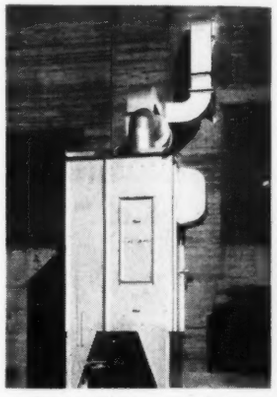
(Special perforated Monel alloy sheets were supplied by The Harrington & King Perforating Co., Inc., Dept. CP, 5636 Fillmore St., Chicago 44, Ill. . . . or for more information check 2604 on form opposite last page.)

Removal of dust from outside air lowers maintenance costs about 50% ...

formerly motors were frequently out of service due to coal dust

Problem: In a dusty plant area, it was a relatively common occurrence to have motors and switchgear out of service due to cleaning, replacing bearings, or other maintenance work. These dusty conditions existed at the Geneva Works, United States Steel Corporation, near Salt Lake City, Utah.

Electrical equipment affected by dust is in the hammermill motor room in coal handling system. Switchgear and drive motors are separated from the two hammermills by a partition. However, coal dust generated by hampermills permeated through windows and door cracks in considerable quantities and settled on the electrical equipment. This, of course, presented a fire hazard as well as a maintenance problem.



Dust collector employing cloth-tube filters, which furnishes clean air for hammer mill motor room at United States Steel

Size range of dust varies with the seasons. During the summer months about 75% of the particles are below 10 microns. This small particle size suggested that an air filter system would have to be employed for efficient removal of dust.

Solution: To correct the condition, a dust collector employing cloth-tube filters coated with

(*Please turn to page* 27)

A similar dust collection unit provides cool, clean, filtered air to protect instruments in this control room and to furnish temporary relief to operators from heat in area

Mill scale removal by Dowell started this new plant off with a $100,000 operating profit

Here's how the management of a multi-million dollar corporation used its knowledge of chemical cleaning to start a new plant off in the right way—in the black.

Following construction, and before the plant was put on stream, Dowell was called in to remove mill scale from the following systems:

• Ammonia Compressors Suction and Discharge Piping • Engine Water-Cooling System • Engine Oil-Cooling System • Engine Jackets • Hydraulic Oil-Cooling System • Oxygen Suction and Discharge Piping • Miscellaneous Piping • Product Lines to Storage • Miscellaneous Towers

The total cost of this mill scaling was approximately $5,000. But, once in production, this plant did not have a single major shut down for maintenance caused by mill scale. The plant management credits Dowell Service with netting the plant an operating profit somewhere between 10 and 20 times the cost of the chemical cleaning. This amounted to between $50,000 and $100,000 the first year.

This particular case history is about a chemical company, but Dowell has startling performance data to show you—from your own industry. That's because chemical cleaning is so versatile. Dowell engineers are experts in removing scale and sludge from process systems, tanks and piping. They apply solvents in various ways—such as filling, jetting, cascading. Dowell furnishes all the necessary chemicals, trained personnel, pumping and control equipment.

For specific information on how chemical cleaning can help you to greater profits, call the Dowell office near you. Or write Dowell Incorporated, Tulsa 1, Oklahoma.

have Dowell clean it chemically DOWELL

A SUBSIDIARY OF THE DOW CHEMICAL COMPANY

When inquiring check 2607 opposite last page

ONLY Allis-Chalmers

ALLIS

rs MOTORS are "double protected"

New Integrated Field Coils Plus *Silco-Flex* Stator Insulation Provide Superior Motor Protection . . . Under Any Operating Conditions

1 **Integrated Field Coils** are bonded in heat-stabilized resins, enclosed in a resin-impregnated sheath of oriented glass fibers and bond-locked on the pole structure . . . dimensionally stable to withstand heating and thermal shock, vibration and fatigue at elevated temperatures . . . sealed throughout against atmospheric contaminants and fully protected against destructive forces.

2 ***Silco-Flex* Insulation** provides a homogeneous, void-free insulating wall of silicone rubber on stator coils. It is unexcelled in life and thermal stability at high temperatures . . . resistant to most chemicals, water, weather . . . outstanding in flexibility and resilience . . . able to withstand abrasion and corona . . . resistant to physical and mechanical forces.

Exclusive Allis-Chalmers "double protection" is available on large electrical machines with operating temperatures through Class B range.

Silco-Flex is an Allis-Chalmers trademark.

For more information on these quality insulation systems contact your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin for Integrated Field Coil Bulletin 05R8525 and *Silco-Flex* Insulation Bulletin 05R8341.

Allis-Chalmers "Double Protection," with integrated field coils and Silco-Flex stator coil insulation, adapts this 600-hp, 2300-volt, 600-rpm synchronous motor to the most severe operating conditions.

S CHALMERS

A-C ALLIS-CHALMERS

A-5221

Why were YOU selected to receive CHEMICAL PROCESSING?

. . . why aren't you required to pay for your subscription?

A well-edited business magazine reflects the interest, needs, and caliber of its specialized readers. Visualize, if you will, a magazine intended for auto mechanics devoting space to articles about gardening . . . or an interior decorator's magazine running articles about hot-rod racing.

Obviously, the mechanic and the decorator would soon lose interest . . . since their magazines would not be paying attention to their particular on-the-job needs.

In a less obvious way, perhaps, something similar can take place if the circulation of a publication gets "diluted" with many "readers" who are not intimately concerned with the specialized field the magazine is intended to serve.

This could happen if a magazine were sold to "just anyone with the subscription price".

The editor of a magazine having such a "diluted" circulation would labor under a handicap. He would feel the need to serve all his readers, whose jobs and problems run the gamut from top to bottom of his industry (and other industries as well). Inevitably, his articles would be "over the heads" of some readers and beneath the interests of others. The result? A "hodge-podge" that wouldn't really satisfy any reader.*

Fortunately, the editors of CHEMICAL PROCESSING do not labor under this yoke. Our circulation is "controlled." There is no subscription charge.** Readers are handpicked according to strict qualifications, taking into account their firm, function, and title. We, as editors, know our audience as specialized readers concerned with processing and closely related functions in the chemical and allied processing industries . . . men who want to know the practical slant on methods, ideas, materials, and equipment they can use in solving their everyday plant problems. And so, CP is not geared for students, beginners, and others who have little or nothing in common with these men.

Because we control circulation, CHEMICAL PROCESSING articles can be prepared with the confidence that all readers have a high degree of professional competence and a considerable background of successful experience. We can, therefore, dispense with the tedious repetition of "stage-setting" phrases and explanatory passages necessary when writing for a heterogeneous audience. We can get right to the heart of our subject matter . . . making for shorter stories, faster reading, more useful ideas per reading minute.

You may ask . . . "How do you know these people are actually reading your magazine?"

Reader response is the answer. Each month, thousands of readers, after reading the articles and advertisements in CP, use the Reader Service slip (opposite the last page of each magazine) to get further specific information to meet their specific needs. A check on these slips as they arrive in our office tells us the type of readers who are **actually reading and using CP** . . . and indicates what they are interested in. And the record shows that the processing man is **the** reader of CP.

Our column in the February issue (page 81) discussed our "audit of known readership" — an analysis, by titles, of readers responding to articles and advertisements in a specific issue. This audit corroborates the statement that CP is read and used by the men for whom it is intended.

To sum up . . .

A fully effective industrial magazine must 1) strictly define its audience, 2) make sure its circulation adequately covers that audience, 3) prevent "dilution" of circulation with names outside the defined audience, 4) publish only those articles that will help readers in that audience in their work, and 5) check often to be sure this audience is **really** reading the publication.

Controlled circulation is our choice as the best way of meeting these requirements. That's why we use it — to serve you, and more folks like you, with a more useful publication.

The Editors
of CHEMICAL PROCESSING

*General or "mass" magazines do not have this problem of "handpicking" special readers. They simply serve people as people. So paid circulation methods are practicable for them.

**As CP renders a public service, men outside the orbit of the special field served may buy CP at $1.00 a copy, or $10.00 a year. Such paid subscriptions are few in number . . . they are not included as "chemical processing" circulation on BPA Audit Reports.

For more information on product illustrated on preceding center spread, specify 2608 . . . see information request blank opposite last page.

(*Continued from page* 26)

filter aid was placed in service early in 1955. Collector was connected to a 3600 cfm fan at 4500′ elevation and 4″ static pressure.

All openings and cracks in motor room were sealed and sufficient clean air introduced to provide a positive room pressure. To maintain necessary ventilation and also create desired room pressure, a counterweighted exhaust louver was used.

Results: Maintenance costs on electrical equipment have been reduced about 50% over what they were two years ago. Some of this saving may have been due to improved maintenance techniques. It has not been necessary to replace the filter aid to date. Collector efficiency is better than 99%.

After the original installation was made, a similar dust collection unit was installed on control room housing instruments on sintering plant burner floor. Cooling is accomplished by passing filtered air over a series of refrigerating coils. This cool room with clean, filtered air protects the instruments and affords temporary relief to operators from heat that prevails in area. A third, similar installation was also made for sinter plant transformer room, having five transformers and control equipment.

(Ultra-filtration dust collection system is product of Wheelabrator Corp., Dept. CP, Mishawaka, Ind. Check 2609 opposite last page.)

"Chief, that polymerization accelerator is too fast! I was smelling the monomer and look what happened!"

Credit Kerry E. Mills, American Oil Co., Texas City, Texas, with this cartoon idea

NEW SOLUTIONS of processing problems

Tells how electronic computer solved construction problem

Four-page illustrated report describes in detail how complex construction problem on natural gas pipeline was solved with electronic computer in less than 12 minutes at a cost saving of 900 percent. Problem of determining source and destination pressures over 300-mile pipeline, equations used, and methods of computation are explained with the aid of diagrams.

Report 2 is issued by Bendix Computer, Div. of Bendix Aviation Corp., Dept. CP, 5630 Arbor Vitae St., Los Angeles 45, Calif. When inquiring specify 2612 on form opposite last page.

Fusion-bonded, hard-facing alloy protects plungers of pumps used for acidizing . . .

ten times previous life obtained while handling abrasive sand-acid mixture

Problem: Only about 12,000 gal of acidizing mixture could be handled by pumps using plungers made from a heat-treatable metal before replacement was required. Corrosive and abrasive nature of the sand-acid mixture used in the fracturing treatment made it a difficult material to pump.

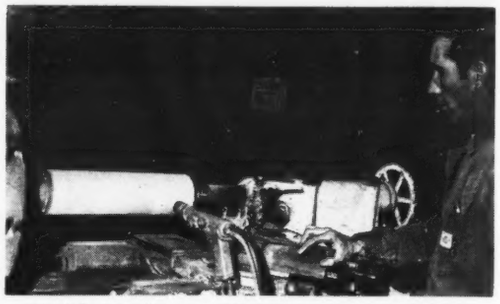
Dowell truck unit used for acidizing service. Plungers used in pumps that deliver sand-acid mixture to formation are protected with hard facing alloy

Acid used in mixtures is hydrochloric, which varies in strength from 1 to 15%, depending on solubility of formation being treated. Oddly enough, the corrosive nature of the acid is not the principal factor that caused the premature wear and failure of acidizing pump plungers. Corrosive effect of acid is reduced by the chemical inhibitors added. Abrasion resulting from contact with sand particles was major factor affecting plunger life.

Solution: In search for a suitable means of prolonging service life of plungers, many materials and techniques were tried. Hard chrome

plating, various steel alloys, different heat treatments, and several hard-facing alloys were all tried and compared for effective abrasion resistance.

From this work, No. 6 hard facing alloy, a nickel-base material containing chromium borides, demonstrated the greatest ability to resist abrasion. This material has a Rockwell hardness of 60 (C scale). Resistance of material to abrasion and



Hard-facing alloy is applied in powder form through a spray—welding pistol unit

galling is attributed to this hardness and to its ability to maintain its initial low coefficient of friction in service. Corrosion resistance of alloy is also good.

Plungers to be hard-faced are first mounted in a lathe and undercut 0.080" on the diameter using a carbide tool. Turned part is then blasted with angular steel grit to make surface conducive to good bonding. In next step, No. 6 hard-facing alloy in powdered form is applied through a Spraywelder pistol while plunger rotates in lathe. With plunger still rotating, protective alloy coating is fused to parent metal through application of a pair of oxy-acetylene torch flames. Rotation of part distributes heat uniformly and controls warpage. After plunger is machine-ground to finish dimensions, it is ready for installation in pump.

Results: Mild steel plungers coated with the No. 6 hard-facing alloy currently pump as much as 125,000 gal of the acidizing mixture before requiring servicing — ten times as much as previous plungers.

(No. 6 hard-facing alloy is product of Wall Colmonoy Corp., Dept. CP, 19345 John R. St., Detroit 3, Mich. . . . or for more information check 2615 on form opposite last page.)

This month's Processing and Engineering Data Section, dealing with chemical materials, starts on page 82

April 3. Society of Plastics Engineers, Regional Technical Conference, "Plastics in Building," Statler Hotel, New York.

April 7-12. American Chemical Society, national meeting, Miami, Florida.

April 8-12. American Welding Society, annual national spring meeting, Hotel Sheraton, Philadelphia.

April 9-11. Fifth Welding Show, Convention Hall, Philadelphia.

April 10. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

April 16-18. Symposium on Non-Destructive Tests of Nuclear Energy, sponsored jointly by American Society for Testing Materials, American Institute of Chemical Engineers, American Nuclear Society, and Society for Non-Destructive Testing, Morrison Hotel, Chicago.

April 24-25. National Industrial Research Conference, Conrad Hilton Hotel, Chicago.

April 27-*May* 2. Scientific Apparatus Makers Association, Greenbrier Hotel, White Sulphur Springs, W. Va.

April 29-*May* 1. American Oil Chemists' Society, Roosevelt Hotel, New Orleans, La.

April 29-*May* 3. Seventh National Materials Handling Exposition, Convention Hall, Philadelphia.

May 8-11. Fluid Controls Institute, meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

May 9-10. Conference on Managerial Controls, Illinois Institute of Technology Campus, Chicago.

May 12-16. The Electrochemical Society, Inc., meeting, Hotel Statler, New York.

May 13-14. Commercial Chemical Development Association, resort meeting, French Lick, Indiana.

May 13-16. American Petroleum Institute, Division of Refining, semi-annual meeting, Sheraton Hotel, Philadelphia.

May 14-16. Industrial Nuclear Technology Conference, Museum of Science and Industry, Chicago.

May 20-22. Chemical Specialties Manufacturers Association, 43rd midyear meeting, Drake Hotel, Chicago.

May 20-23. American Society of Mechanical Engineers, Second Design Conference and Design Engineering Show, Coliseum, New York.

May 20-24. American Society for Testing Materials, Fifth Conference on Mass Spectrometry, Commodore Hotel, New York.

May 20-24. National Fire Protection Association, annual meeting, Hotel Statler, Los Angeles.

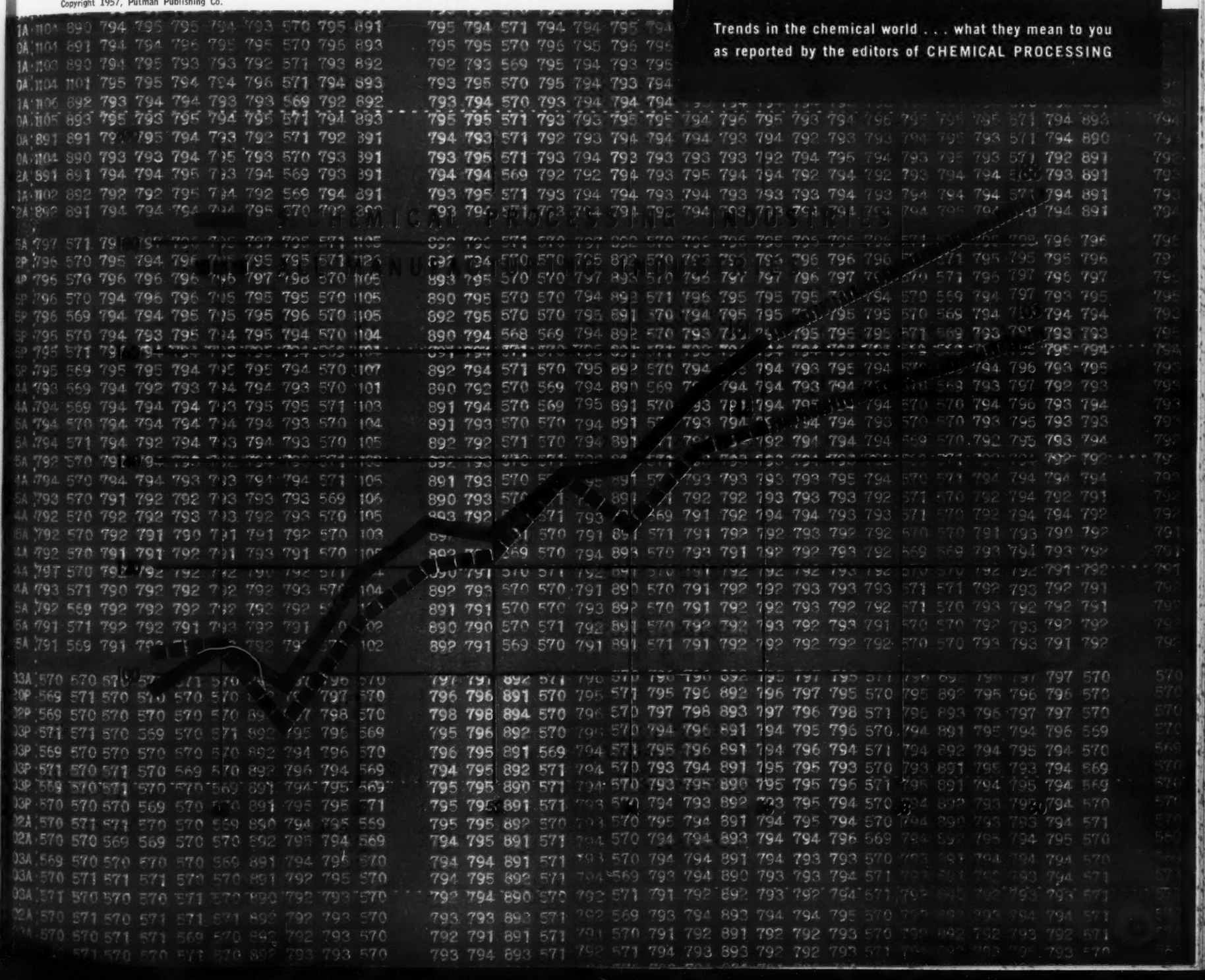
May 27-29. Synthetic Organic Chemical Manufacturers Association, annual outing, Skytop, Pa.

Vol. V No. 4 APRIL 1957

chemical business

Trends in the chemical world . . . what they mean to you as reported by the editors of CHEMICAL PROCESSING

▼ Chemical gains over the years



When inquiring check 2618 opposite last page

chemical business

APRIL 1957
Vol. V No. 4

Highlights

■

"Panalog" log-out sheet reproduced on this month's Chemical Business cover courtesy Panellit, Inc.

Profits, Management, Unions Hassled Out by AIChE

WHITE SULPHUR SPRINGS, W. Va. — That 1957 will be known as "the year of the profits squeeze" was the prediction of many speakers at the AIChE Spring Management Conference held here at the swank Greenbrier Hotel.

Still, most agreed that the situation will clear over the next few years and industry will retain its high expansion curve. And no raw material shortages were foreseen even though predictions ranged as high as a ten-fold industry expansion in the next 25 years.

On AIChE licensing panel: (L to R) DuPont's C. H. Evans, Don Katz, University of Michigan, E. T. Neill of Dow, Fluor's B. B. Kuist, W. W. Hodge, and at the rostrum, Ethyl Corporation's T. J. Carron

Synthetic fibers, plastics, and other organics — especially petrochemicals — will see major growth. Synthetic fiber sales in 1957 may be eight times their present level, plastics at ten times by 1980. Inorganics, too, are in for major development and growth.

"Meet monopoly with more monopoly," was suggested regarding unionization. **Forrest Kirkpatrick,** assistant to the president of Wheeling Steel, told employers to band together in bargaining with labor unions in order to bring power into balance. Both Kirkpatrick and AFL-CIO Chemicals Workers Union President **Jack Knight** agreed that current engineer shortages and high starting pay with slow raises make ripe ground for unionizing.

Mrs. Aryness Joy Wickens, Deputy Assistant Secretary of Labor, warned of a serious manpower shortage. Older

(*Please turn to bottom of next page*)

Industry's High Profit Margins in Jeopardy?

Traditionally high profit margins and quick return in the chemical industry seem to be going the way of the nickel cigar and the free lunch — particularly in the case of the larger companies. As the 1956 sales and profit figures become available, it is becoming apparent that the smaller organizations have been able to keep the sales/profit ratio in line, at least to a reasonable degree, while the bigger companies — Allied, Monsanto, DuPont, etc. — have all fallen behind to varying degrees.

Figures recently published by the Value Line Investment Survey show that of a selected group of 14 chemical companies — seven with 1956 sales of over a half-billion dollars and seven under — only two of the larger group were able to increase their earnings, and these not proportional with the sales increase. Of the small group, only two reported decreased earnings in 1956.

	SALES ($ Millions)		OPERATING PROFIT MARGIN	
	1955	1956	1955	1956
Large Companies				
ALLIED	$ 628.5	$ 668.9	22.7%	19.9%E
CYANAMID	451.1	505.0E	21.8%	23.3%E
DOW	521.6	599.6	32.4%	30.6%
DUPONT	1941.4	1920.0E	36.5%	31.9%E
MONSANTO	522.3	541.9	22.8%	20.5%
OLIN MATHIESON	560.5	605.0E	18.8%	19.0%E
UNION CARBIDE	1230.6	1324.5	32.1%	29.9%
Smaller Companies				
AIR REDUCTION	$ 149.2	169.8	22.1%	24.3%
DIAMOND	110.3	121.3	25.7%	24.1%E
HEYDEN	24.7	25.0E	13.6%	14.7%E
HOOKER	94.2	100.0E	29.2%	27.3%E
PENNSALT	67.8	76.0E	18.7%	19.2%E
TENN. CORP.	66.5	72.0	24.4%	28.1%
VICTOR	48.4	50.0	23.0%	21.3%E

E — Estimated.

A random sampling of other recently reported figures shows substantially the same situation:

	EARNINGS PER SHARE	
	1955	1956
US RUBBER	$6.07	$4.43
UNION CARBIDE	4.86	4.86
SUN OIL	4.72	5.22
CHAS. PFIZER	2.94	3.36
PENNSALT	2.80	2.92
HERCULES	2.30	2.13
DUPONT	9.26	8.20
CYANAMID	4.07	4.21

This is not to indicate that the chemical industry is in any way depressed. However, the Value Line suggests, the

(*Please turn to next page*)

Diamond Crystal Buys Interest in Jefferson Island Salt

In a move to get into the growing southern chemical market, Diamond Crystal has bought controlling interest in the Jefferson Island Salt Company, the South's largest salt producer.

J. Lyle Bayless Jr., Jefferson Island president, becomes a director of Diamond Crystal and consultant on Jefferson Island product sales.

Charles F. Moore, Diamond Crystal's president and board chairman, stated that Jefferson will operate as an independent division with its entire sales, office and production staff being retained. The Jefferson Island product line and brand names will also be continued.

Moore said that the acquisition will increase Diamond Crystal's dollar volume by 33 percent and will double its tonnage.

"Acquiring Jefferson Island will enable us to diversify our investment in the salt industry in two ways," Moore explained. "It will give us a going business in another geographical area — the South — where freight rates have made it impossible for us to compete. And it will add rock salt to our present line of products. The rapid industrial growth of the South in chemicals means that markets for industrial salt are expanding there."

Profits

(*Continued from preceding page*)

generally high profit spreads will tend to narrow over the coming years. Thus, despite expected strong sales growth, earnings may not advance as fast in the future as they have in the past.

However, the chemical industry has one built-in factor which, from the present vantage point, practically assures maintenance of continued high net income. The accelerated amortization privileges granted to the industry during the Korean crisis have been used to the utmost by the chemical companies. This has provided them with non-taxable cash which has been used for expansion purposes. From the financial viewpoint, it has resulted in understating share earnings. This amortization will begin to run out in the near future, allowing — or perhaps, forcing — the various companies to report higher income.

For a look at The Value Line's views on chemical profits, write The Value Line Investment Survey, 5 East 44th Street, New York, N. Y. or check 2619A opposite last page.

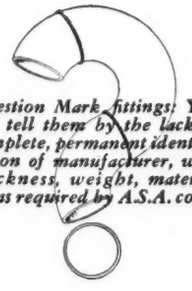
AIChE

(*Continued from preceding page*)

people will be asked not to retire, and women may have to enter these traditionally male domains.

Diamond Alkali's **W. A. Crichley** advised against indiscriminate computer use. Describing a "fad" for computers, he added that "a lot of companies would be better off without them." MIT's **Dr. Robert Gregory** observed that "Although much attention is given to 'compression of raw data,' too little is devoted to producing the information necessary to making wise decisions." DuPont's **Dr. Robert Hershey** summed it up: "Computers are not a panacea for management problems. There is no substitute for management judgement."

Why try to cut corners with *Question-Mark** fittings?



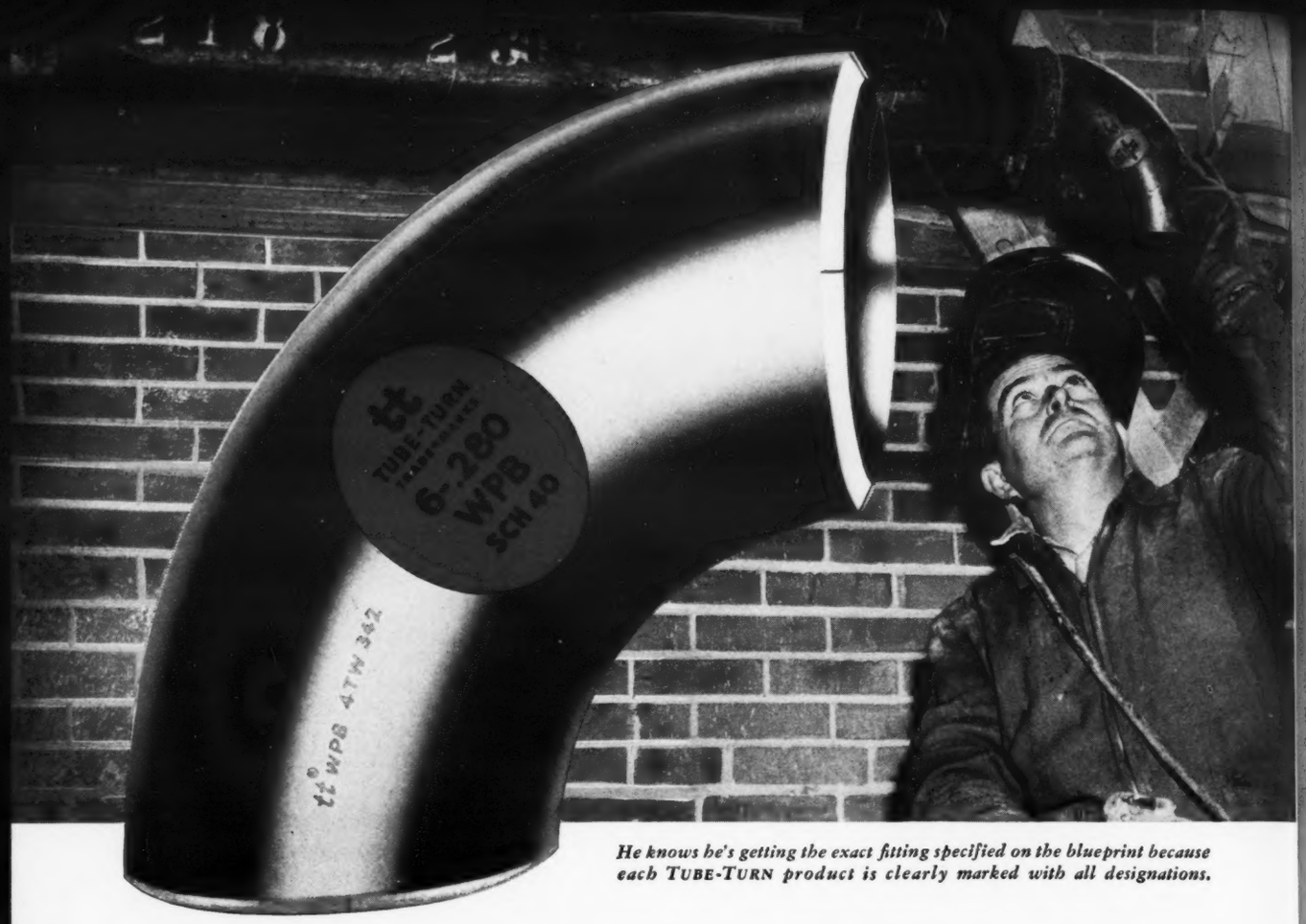
* *Question Mark fittings: You can tell them by the lack of complete, permanent identification of manufacturer, wall thickness, weight, material ... as required by A.S.A. code.*

Unknown welding fittings are as risky as unmarked turns on a busy highway. These blind spots in an expensive piping project cause slow-downs, confusion, trouble . . . waste time and money.

"Question Mark" fittings may look like a bargain on the price tag, but watch out for the after-costs . . . poor fit-up, impaired quality, questionable supply, lack of engineering service! Your reputation is at stake!

A message in the interests of top quality piping ...
by Tube Turns, Louisville, Kentucky.

HOW TO SAFEGUARD YOUR REPUTATION



He knows he's getting the exact fitting specified on the blueprint because each TUBE-TURN product is clearly marked with all designations.

Save manhours...avoid piping risks with known fittings

You save purchasing time, get prompt delivery, speed up installation, and help assure reliable piping performance when you specify TUBE-TURN* Welding Fittings and Flanges. They meet all American Standard and Safety Code requirements. Each product is permanently marked with complete size and material designation. Your nearby Tube Turns' distributor gives you prompt delivery from the complete-line stock, and makes available Tube Turns' unmatched engineering service.

You *know* your piping investment is safeguarded when you specify and buy Tube Turns' products.

Your nearby Tube Turns' Distributor meets your needs promptly from the complete line of more than 12,000 Tube Turns' stocked items.

The Leading Manufacturer of Welding Fittings and Flanges

TUBE TURNS LOUISVILLE 1, KENTUCKY

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DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Chicago • Detroit • Atlanta • New Orleans • Houston • Midland Dallas • Tulsa • Kansas City • Denver • Los Angeles • San Francisco • Seattle

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*"TUBE-TURN" and "tt" Reg. U. S. Pat. Off.

A Look at Tomorrow and Today

Analysis of 1956 production figures for the chemical and various allied industries indicates previous predictions were pretty well correct, point to even higher growth curve for the industry over the next few years.

Figures compiled by the Putman Research Organization show that the average of all manufacturing industries stood at 145 on the Federal Reserve Board index at the end of 1956 while the chemical industry stood at 163 . . . a difference of about 12 percent (see page 31). Predicted levels for 1960 show the difference will increase to something like 15 percent. These, of course, are production figures . . . the profit picture may be another story (see Profits in Jeopardy, page 33).

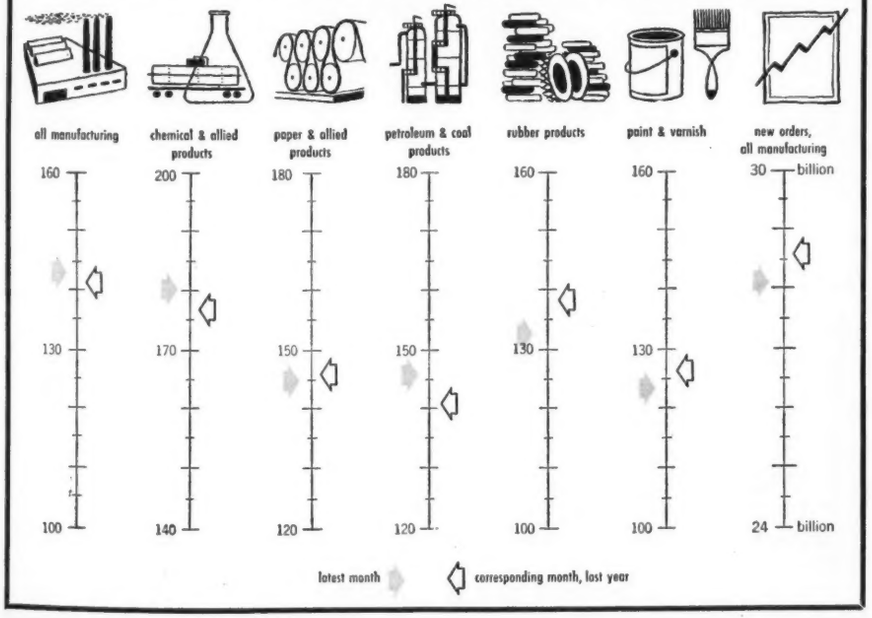
A look at the various segments of the chemical industry shows:

- Petrochemical production in 1956 up 10 percent over 1955. Number of petrochemical plants reported as increasing about 10 percent yearly. Plastics and resins also up 10 percent, with another 5 percent increase expected for 1957.
- Pharmaceutical leaders look for a 1957 sales gain between 6 and 11 percent over last year's record $2.1 billion.
- Paper production in 1956 up 5 percent over 1955 . . . a normal 3 to 4 percent gain expected for 1957. Ten years ago we consumed 344 pounds of paper per capita; last year we consumed 435 pounds each and there are 27 million more of us.
- Corporate profits, after taxes, $21 billion in 1956. But . . . salaries, wages and "fringe benefits" were ten times as big, $200 billion. Fringe benefits alone amounted to $12 billion . . . a million dollars every working hour.

For a look at the findings, check 2621 on form opposite last page.

chemical business **INDEX**

Production indices, from latest available Federal Reserve Board figures, based on 1947-49=100. New Orders, All Manufacturing, (last column) from latest available Department of Commerce data.



chemical business

Our Growing Industry

Durez Plans Production of "Entirely Different Line" of Polyester Molding Compounds

Entering into production of what it terms an "entirely different line" of light-colored polyester molding compounds in both regular and self-extinguishing grades, Durez (division of Hooker Electrochemical) has announced construction of a $570,000 addition to its facilities at North Tonawanda, New York.

To be completed this Fall, the operation will supply commercial quantities of polyester resins which, up to now, have been available only in experimental quantities. The materials have been offered to a very few customers in such colors as beige, yellow, turquoise, and pink.

Hooker president **Bjarne Klaussen** said the materials will be sold as dry-powders rather than large chunks or semi-solids as is true of most other polyesters.

While the new materials will compete with Durez' present line of plastics (principally phenolics), Hooker expects a substantial net gain in plastics sales from the added line.

Third TiO_2 plant

. . . for DuPont, with a daily capacity of 125 tons, will be built near New Johnsonville, Tenn. To employ about 400 workers, the operation is expected to go on-stream sometime early in 1959.

Company's other TiO_2 plants, at Edge Moor, Del., and Baltimore, Md., are both undergoing current expansion.

Reforming catalyst plant

. . . erected at a cost of $1.5 million, has been completed by Davison Chemical (division of W. R. Grace). Facilities had a partial start-up in 1956, are now in full operation.

Capacity of the new plant is approximately double that originally planned. While plant was under construction market demand rose so plans were revised for additional production.

Chemical Plant Construction in 1956-58 to Total $3.6 Million

"Clearly indicating the confidence of the chemical industry in the strength of the American economy", says **General John E. Hull**, MCA president, of the results of a recent poll of chemical construction.

Highlights of the survey:

- The industry will spend an estimated $2.5 billion on new domestic construction through 1957 and 1958.
- Projects brought into production in 1956 cost more than $1.1 billion. These totaled 354 of the 760 projects included in the survey.

"These large investments in new facilities are being made primarily because of the steady growth of demand for chemicals," Hull said, "both because of the expanding economy and because research is continually developing new uses for chemical products.

"Another important reason," he continued, "is that chemical companies are continually seeking to relieve pressures of higher costs and increasingly strenuous competition by investing in more efficient production units."

Of the facilities completed in 1956, the largest share, $862 million, went into organic chemicals operations. Second was inorganic chemicals with $816 million. In third place with $465 million invested was chemically produced metals or metallic compounds.

Scientific Manpower—Supply and Demand

In the public interest, the B. F. Goodrich Company has published a study showing various factors which affect the supply and demand of engineers and scientists in the United States.

John L. Collyer, chairman, and **W. S. Richardson,** president, say the prospect of a limited supply is a continuing threat to our continuing advancement. "The study is designed to provide information upon which the extent of our manpower needs may be gaged and to suggest possible areas of action for meeting the needs," comments Collyer.

If you are interested in some of the long- and short-range problems that could result from the current supply and demand factors, write B. F. Goodrich Company, Akron, Ohio, for "A Study of the Scientific Manpower Problem of the United States" . . . or check 2623A on Reader Service slip opposite last page.

MCA "Facts Book" Ready Soon

Soon to be published MCA "Chemical Industry Facts Book," while not revealing anything shocking, still contains some interesting pieces of intelligence about the industry.

The new edition contains rather detailed studies on such subjects as research expenditures, engineers' salaries, and inter-industry exchange of chemicals, as well as "educated guess" projections on various phases of the industry.

Rassweiler to Receive 1957 Chemical Industry Medal

Clifford F. Rassweiler, vice chairman of the board and v-p for research and development at Johns-Manville, has been named to receive the Chemical Industry Medal for 1957 "for conspicuous services to applied chemistry." Formal presentation of the medal will be made in October by the American Section of the Society of Chemical Industry, donor of the medal.

chemical business

Marketing Trends

Reinforced Plastics Hit Marketing Stride

Even more important than volume gains in 1956, a sizeable 30 percent jump over 1955, is the entry of reinforced plastics into solid new markets and the entrance of old established manufacturers into the manufacturing field, says The Society of the Plastics Industry. Reinforced plastics are penetrating volume markets formerly held exclusively by die cast aluminum, porcelainized steel, and molded plywood. Equally important is the widening manufacturing base for reinforced plastics because compression molders and others are entering the field, spending substantial sums for reinforced plastics development and research.

Importance of the trend is that stability and a sound approach to the industry's problems are being generated. With a remarkably steady growth of 30 percent annually, the reinforced plastics industry needs methods, money and good basic marketing applications. And the present situation appears more and more fertile as the year 1957 wears on.

In reporting on the growth of the industry, **Clare E. Bacon** of Owens-Corn-Fiberglas says advances in processing are bringing the industry closer to a goal of "parts per minute" rather than "minutes per part." Bacon also says

Truck bodies that withstand corrosion for use in the food industry are among first products of epoxy resin reinforced plastics

volume fields for reinforced plastics in 1957 are the whole transportation industry . . . and household appliances, furniture and seating, containers, construction and electrical components.

All five of the major automobile manufacturers are today using reinforced plastics for some body components. Westinghouse Electric Corporation is working on the idea that reinforced plastics can solve problems of "planned obsolescence" by making it more economical to turn out shorter runs of a model.

What does this mean to manufacturers of polyester resins and epoxies? The big sales increases of 1956 will continue into 1957 at the same or at increased rates. Significance of the 140 million pound 1956 sales figure of reinforced plastics is that resins accounted for 70 million pounds of the total; reinforcements and fillers for the remaining 70 million pounds. As for the types of resins used, polyesters comprise an estimated 65 million pounds of the 70 million resin total. Of the remaining five million pounds, close to four million pounds were epoxies, 500,000 pounds low pressure phenolic and the remaining 500,000 pounds divided among plastic resins as silicones, polystyrene, melamine, vinyl.

But the bright new stars are the epoxies. Although they require more expensive equipment and manpower to produce and their price is almost twice that of the polyesters, the epoxies have greater resistance to corrosion and greater compressive strength. The big increase in use of reinforced plastics is expected to be in the transportation field and in construction. Epoxies appear to solve some of the problems expected in the two fields. . . . And when use of epoxies takes hold, the petro-chemical industry's already big stake in plastics will take a decided jump.

Aerosol Propellant Operation Planned by Carbide and Carbon

Close on the heels of Pennsalt's announcement of construction of its second fluoro-carbon unit, Carbide and Carbon Chemicals announces that it, too, is going into the propellant and refrigerant business. Plans call for a 50 million pounds per year plant to be in operation by the latter half of 1958. The unit will be located at Institute, W. Va.

"The market for fluorocarbons has grown amazingly in the last twelve years," says Carbide and Carbon president **D. B. Benedict,** "and with Carbide's planned unit the total US capacity will exceed 300 million pounds annually. Production and sale of the fluorocarbons is our first commercial step into the promising field of fluorine chemistry."

The new products will be marketed as refrigerants and propellants by a sales organization now being established under Carbide v-p **John A. Field.**

A-D-M Offers Straight-Chain Alpha Olefins

High-purity alpha olefins — C_{12} to C_{22} hydrocarbons, with one double bond located between the "one" and "two" carbons — are now being made available for the first time. Made from animal and vegetable oils at Archer-Daniels-Midland's new Ashtabula, Ohio, plant, the olefins are highly reactive and, because of their straight-chain configuration, suggest a number of commercial possibilities.

Big potential appears to lie in the field of lubricating oil additives and corrosion inhibitors. Textile, leather, paper, plastics, and adhesive industries also may find advantages in the materials.

You'll find a discussion of these and other similar straight-chain products in this month's Chemical Materials section starting on page 43.

New Managerial "Look" at Allied

In a move to "strengthen central direction of all operating divisions", Allied Chemical has, in one fell swoop, moved ex-president **Fred Emmerich** to post of board chairman, moved v-p **Glen B. Miller** to the presidency, designated six new vice-presidencies to cover six yet undesignated areas of responsibilities on the corporate level, and revamped its executive committee.

Although the v-p's have not yet been assigned specific areas, they will presumably cover such functions as manufacturing, research, sales and marketing, each responsible for these functions throughout all the divisions.

The three newly-appointed v-p's are **Carlton Bates,** formerly president of Solvay Process, **Frank L. Linton,** Allied's comptroller, and **James Sheriden,** Treasurer.

The executive committee, previously called the finance and executive committee, will be headed-up by **Kerby H. Fisk.** Other members, all Allied directors, are **Eugene Meyer, Henry M. Minton, C. W. Nichols,** and **Harry S. Ferguson.**

From Our Readers . . .

Dear Sir:
In your Chemical Business Index, would you not have made a clearer comparison if you had made a uniform scale for all indices instead of several different scales. I'm ashamed for you.

W. R. Bingham
Passaic, N. J.

The uniform scales were sacrificed in the cause of space limitations. If many more readers are ashamed for us, we'll be reconsidering.

Editor

Gentlemen:
. . . I appreciate your snapshot style of writing . . . There is one small suggestion: Why not include the name of the major engineer-constructor who builds the new chemical facilities?

Martin E. Kantor
Alhambra, Calif

chemical business

Spotlight on people

Frederick J. Kirchmeyer, long-time head of pharmaceutical research at Abbott Labs, is appointed director of new products. In this new position, Kirchmeyer will head the new product program with Abbott's scientific divisions. Also at Abbott . . . **Dr. Arthur W. Weston** replaces **Dr. Robert D. Coghill** as director of research. Dr. Coghill will be serving the company as a consultant until April.

New vice president of Stauffer is **Charles W. Mitchell** who is also new general manager of company's Nyotex Chemicals division.

Mitchell

Three changes involving managerial assignments at Detroit plant of Allied's Solvay Process Division make **James E. House** assistant to director of operations, **William J. Bobek** new manager, and **Paul B. Cornell** assistant manager.

3M promotes **Harrison C. Paulus** to position of supervisor of market research for new products division.

New director of marketing and economic research for Foster D. Snell, Inc. is **Richard S. Ringheim.**

New assistant sales manager for Becco Chemical is **Albert P. Shutts. Dr. Harold K. Latourette** is named manager of organic research and development for the division.

George R. Vila is elected a vice president of U. S. Rubber Company and appointed general manager of the Naugatuck Chemical division.

Vila

News from Diamond's chlorinated products division . . . **L. J. Polite Jr.** is made product sales manager, **Robert C. Sutter** is holder of newly created post of operations manager, **Mervyn T. Walsh** is appointed to manage muriatic acid sales, and **William J. Esselstyn** is new manager of organic intermediates and new product sales.

New v-p's and assistant v-p's at Archer-Daniels-Midland are **Walter G. Andrews** and **Ralph Bruce,** vice presidents, and **Robert S. Mathews, James W. Stowell,** and **Harry R. Wortham,** assistant vice presidents.

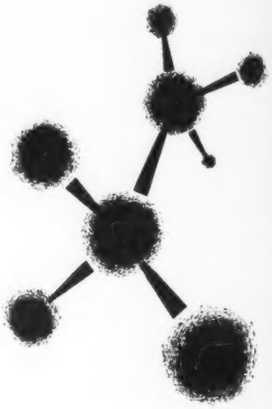
With his return to Goodyear Tire and Rubber, **James A. Merrill** becomes associate director of research and development. Merrill previously was manager of technical division of Goodyear Atomic Corporation.

Merrill

Ralph N. Hoh is appointed Western sales manager of industrial chemicals for American Potash & Chemical.

Spencer Chemical announces five new vice presidents . . . **J. C. Denton,** agricultural chemicals v-p; **H. R. Dinges,** industrial chemicals v-p; **Frank Pyle,** plastics v-p; **Dr. John R. Brown Jr.,** research and development v-p; and **E. V. Friedrich,** administration v-p.

Dr. Frank W. Hurd is new director of research for Union Carbide Nuclear, a division of Union Carbide and Carbon. Also at UCC . . . **D. S. Alcorn** is promoted to post of assistant manager and **T. J. Hall** is made manager of fine chemicals at Carbide and Carbon Chemicals Company.



In addition to the regular articles on latest chemical developments, this month's Chemical Materials section carries another of CHEMICAL PROCESSING Magazine's Annual Reports—Chemicals Introduced in 1956.

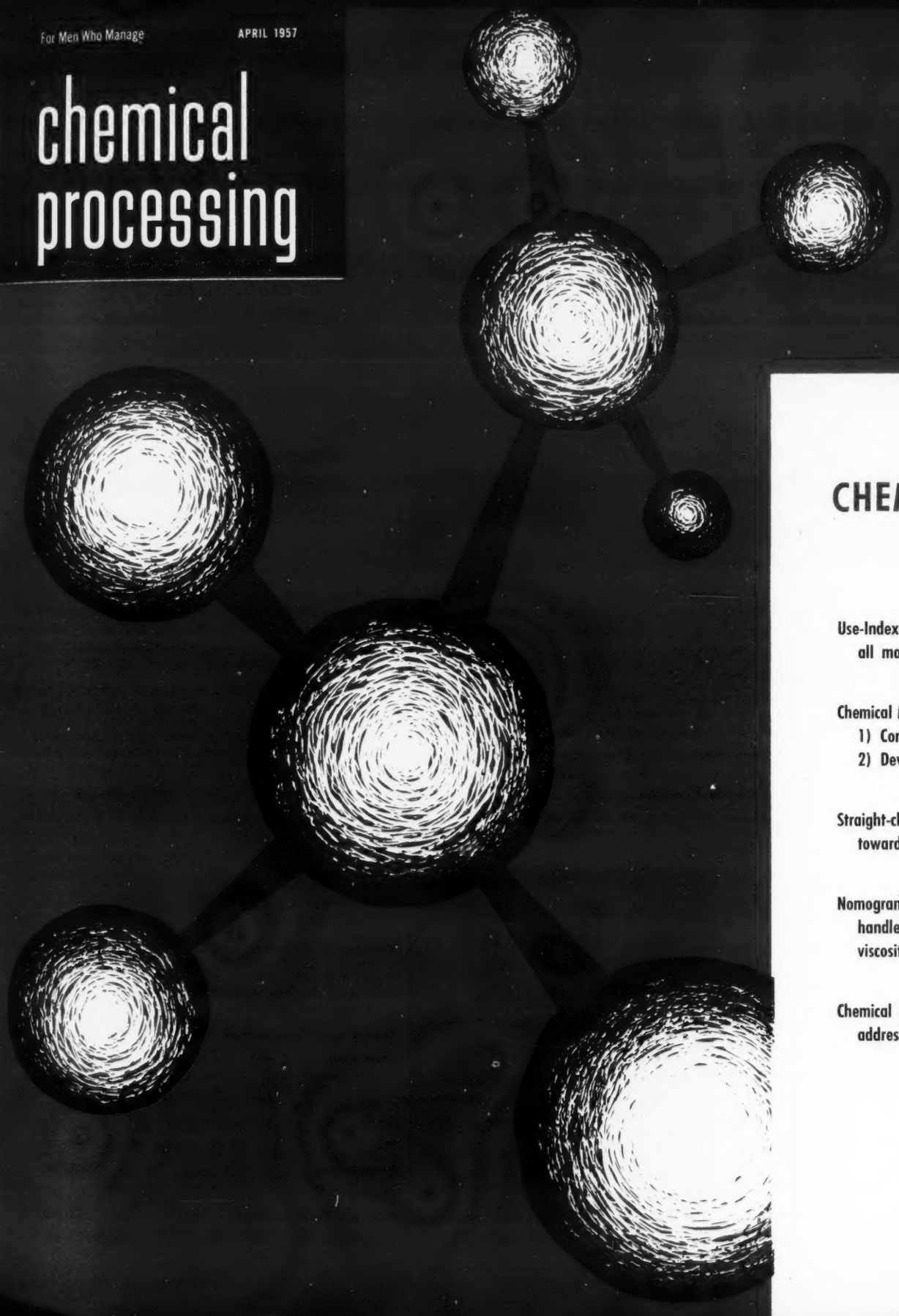
To help you spot quickly and easily just what you might need for a specific application, we've indexed all 617 items by their suggested uses. Flip over the next page to find it.

This massive listing has been divided into two parts: Commercially available materials (page 47) and development-scale items (page 79). Thus, items that are still in the introductory stage will be found in the second listing. All items which are offered for a first time, or which have different characteristics from already available similar chemicals, are marked with an asterisk.

Full addresses of chemical manufacturers mentioned throughout the listings are on page 94.

For Men Who Manage APRIL 1957

chemical processing



CHEMICAL MATERIALS

introduced in 1956

chemicals use-index

use this to PIN-POINT products you need — quickly and easily

Looking for a chemical material to meet a specific need? All products in this report of new chemical materials announced in 1956 (starting on page 47) are indexed here by their suggested uses.

Each type of material described in the report is classified below. If a material is listed as an intermediate for making one of these products, then it will be found under that product as an "Int."

To locate a group of items quickly, check through this "Use-Index." Then look up the numbers of those chemicals classified under this heading.

Commercially available chemicals have numbers below 500, and are described in the first list (page 47). Products still in the development stage, but for which expanding markets are being sought, carry numbers above 500, and are listed and described in the second list (page 79).

Full names and addresses of manufacturers are given in the Manufacturers Listing, page 94.

This index is included with the reprints of this report. Reprints are available at $1 each.

High purity beta-sitosterol controls cholesterol in the blood . . .

sterol is also a promising intermediate for hormone products

Uses: In the pharmaceutical industry.

Features: Recent medical advances in the field of arteriosclerosis have shown this compound to be of value in controlling level of cholesterol in the blood. Compound also shows good potential as an intermediate for hormone-type products.

Description: beta-Sitosterol is now in commercial production. It is derived from vegetable sources in a specially developed process. Its purity is 95-100% total sterols. Melting point (min) is 134°C. Supplied as grey-white crystals, compound is essentially odorless and tasteless.

(beta-Sitosterol is a product of Industrial Oil Dept., Swift & Co., Dept. CP, 1800 165th St., Hammond, Ind. Check 2633 opposite last page.)

Fast wetting agent in liquid form

Uses: Provides fast wetting and penetration in textile, paper, leather, rubber, paint, chemical, and other industrial fields.

Features: Agent is furnished in liquid form which facilitates handling of material.

Description: Monawet MO-70%, di-octyl sodium sulfosuccinate, is reported to be fastest wetting agent now commercially available.

(Monawet MO-70% wetting agent is product of Chemical Div., Mona Industries, Inc., Dept. CP, Paterson 4, N.J. . . . or for more information check 2634 opposite last page.)

For more information on product at left, specify 2635 . . . see information request blank opposite last page.

commercial chemical materials

. . . made available in 1956

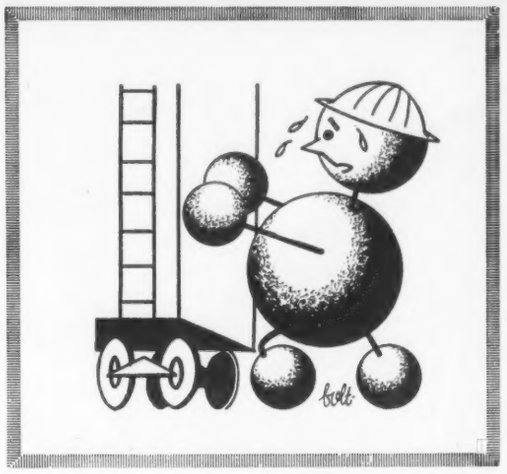
Chemical materials made available on a commercial scale† last year are described in this list.

An asterisk denotes products that manufacturer states were not available to industry prior to the time he introduced his product, or which had special characteristics not available before that time. Those not marked were previously available, but not necessarily from the company indicated.

If you would like additional information on any item, contact manufacturer. Full names and addresses are on page 94.

In looking for materials for specific uses, you'll find it more convenient to first see our "Use-Index," page 44, which is cross-indexed with this list. Find what you want there, then check this list for items with numbers below 500.

†Developmental-scale chemical materials are listed starting on page 79.



1) *ACETAMIDINE HYDROCHLORIDE — Purity 96% min, moisture: 3.5%. Plastics additive, inter for pyrimidines, imidazolines. Merck.

2) ACETOACET-o-ANISIDIDE — Makes Hansa Yellow and Benzidine pigments of improved light-fastness. Undergoes condensation and substitution reactions. Carbide & Carbon.

3) *N-ACETYL DL-HOMOCYSTEINE THIOLACTONE — For biochemical research. Schwarz Labs.

4) ACID AMMONIUM PURPORATE — Murexide reagent. Indicator for calcium determination, especially for water hardness. J. T. Baker.

5) ACRYLIC EMULSION COPOLYMER — 28% solids. Thickener for thermoplastic resin formulations for rugs. Acrysol ASE-60. Rohm & Haas.

6) ACRYLIC EMULSION POLYMER — 40% solids. Thickener for GR-S or butadiene-styrene latices. Acrysol ASE-75. Rohm & Haas.

7) *ACRYLIC INTERPOLYMER, MODIFIED — Lytron 680 is an effective binder for exterior and interior latex paints. Of high durability, strong films form quickly, even at near-freezing temp. Monsanto Plastics Div.

8) ACRYLIC POLYMER, AQ DISPERSION — Rhoplex E-23 for back-coating upholsteries. Exc flex without tackiness, won't stiffen or discolor. Rohm & Haas.

9) ACRYLIC RESIN — Lucite 140 has improved thermal stability, 20-30°F above the max of conventional acrylic resins. This gives improved flow, helps injection molders. DuPont Polychem.

10) ACRYSOL P-4 — Warp sizing agent for Dacron. Non-corrosive. Rohm & Haas.

11) *ADENOSINE 2′:3′-CYCLIC PHOSPHATE, Ba — For biochemical research. Schwarz Labs.

12) *ADENOSINE TRIPHOSPHATE-P^{32} — Labeled in all phosphate groups. Cryst disodium salt; chromatographically homogenous. Schwarz Labs.

13) AGRICULTURAL EMULSIFIER — Triton X-161 imparts excellent spontaneity, stability to pesticide emulsifiable concentrates. Rohm & Haas.

14) ALAMASK ANL and ANL-1 — Odor control agent for animal experimental labs. Rhodia.

15) ALAMASK V-X — For odor control for spray paints and urea-formaldehyde resins. 100% active. Rhodia.

16) ALAMASKS CPM 80 and PC — For odor control in fat processing (rendering). CPM 80 for direct addition, PC is spray type. Both 100% active. Rhodia.

17) *ALIPHATIC AMIDE, HYDROXYLATED — Nopco GS-10 is low cost glycerine substitute in its humectant and plasticizing properties. Has low volatility, low-temp flex, good penetration. Nopco.

18) *ALIPHATIC AMINO ALCOHOLS — Give temporary destaticization of plastics, natural and synthetic fabrics. Electrosol 336 is a white paste; 325, a liquid. Alframine.

19) *ALIPHATIC CYCLO AMINO COMPOUNDS — Antistatic agents for use in dyeing synthetic or mixed textile fabrics. Avasol CFP is a liquid; 112P, a paste. Alframine.

Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
Temperatures are in °C
Solubilities are at room temperature

20) *ALIPHATIC MONOMER, LOW-MW — Electrosol A permanently destaticizes polymerized polyesters when incorporated in them. Alframine.

21) *ALKALI METAL CARBONATES, MIXED — Tech. Potassium, rubidium, cesium carbonates. Glass and ceramics, CO_2 adsorbent. Low cost source of Rb and Cs. Am Potash & Chem.

22) *ALKANOLAMIDE — Superamide B5 increases foam, foam stability, viscosity. Exc detergent and foamer at high temp. Onyx Oil.

23) ALKYD RESIN, COCONUT OIL — Beckosol P-878-60 for top quality baking enamels and nitrocellulose lacquers. Has excellent initial color, and gloss and color retention. Reichhold.

24) ALKYD RESIN, DRYING OIL — P-899-60 Beckosol is used with amine resins to make low viscosity, high solids auto and industrial enamels or with medium oil alkyds for air drying enamels. Exc. pigment compatibility, good drying, enamels have good durability. Reichhold.

25) ALKYD RESIN, LONG OIL DRYING — OP-825-70 Beckosol is for odorless, high gloss interior enamels of good color retention, package stability. Reichhold.

20) ALKYD RESIN, NON-DRYING OIL — P-931-60 Beckosol for use with amine resins for low viscosity high solids enamels that are durable, glossy, of uniform hardness in range of baking cycles. Reichhold.

27) ALKYD RESIN, ROSIN MODIFIED — OP-849-40 Wallkyd is for odorless flat paints providing good performance at low cost. Assures good color and sheen uniformity, imparts good brushing characteristics. Reichhold.

28) ALKYD RESINS — Wallkyd O-1956-35 is made from highly color retentive oils and is supplied in odorless mineral spirits for high quality trade sales paints. Has exc. viscosity stability, color and sheen uniformity, brushing characteristics. Reichhold.

29) ALKYD VEHICLE, NON-PHTHALIC — C-12 vehicle for latex and resin emulsion paints. Improved stain removal, flow, and leveling. Exc wetting, stability. Farnow.

30) *ALKYL ARYL HYDROCARBON — Plasticizer 136 is a low cost secondary plasticizer for PVC resins. Sp gr and viscosity are low. Compounds show good color stability. Barrett.

(Please turn to next page)

new commercial chemicals 31-62

(*Continued from preceding page*)

31) ***ALKYL ARYL PHTHALATE** — Cabflex® HS-31 has low viscosity, volatility in same range as polymeric plasticizers. Uses: Plasticizer for many plastics. Recommended for use in high-temp vinyl insulation and in plastisols for obtaining a low viscosity plastisol with a high degree of permanence. Cabot.

32) **ALKYL ARYL POLYGLYCOL ETHER** — Eumulgin 286 is nonionic emulsifier. 100%-active. For pesticides, disinfectants. Fallek.

33) **ALKYL PHENOXY POLYOXYETHYLENE ETHANOL** — Igepal CF-510, 100%-active, nonionic surface-active agent for mineral oil. Soluble in xylene, ethanol, CCl_4. Dispersible in water. Gen'l Aniline.

34) ***ALKYL PHTHALATE, MODIFIED** — PX-313 Plasticizer for vinyl plastics. Has superior low-temp properties, low price. PittCoke.

35) **ALKYL POLYOXYETHYLENE AMINE** — 100%-active. Katapol PN-430 is a cationic liquid surface-active agent mainly used as an emulsifier for ag chem, min'l oils. Is acid corrosion inhibitor for ferrous alloys. Gen'l Aniline.

36) **ALKYL SODIUM SULFATE, MODIFIED** — Supronyx for detergent formulations, rug shampoos, textile scouring. Onyx Oil.

37) ***ALKYLATED BISPHENOL** — Nopco 1750-A is an additive to alkyd resins and is used in making epoxy resins. Provides internal plasticization in resins. Nopco.

38) **ALLYL ACETONE** — 99.14%. BP: 126-128.5°. Intermediate. NY Quinine.

39) ***ALUMINA, HYDRATED** — R-5005 offers high reaction rate, minimum insolubles. For aluminate nitrate, sulfate, chloride. Reynolds Metals.

40) ***ALUMINUM FORMATE POWDER** — 30% active Al_2O_3. Waterproofing agent. Mordant for alizarin dyestuffs. Easy to handle. Aceto Chem.

41) **ALUMINUM ISOPROPYLATE** — 99+%. For Meerwein-Ponndorf reactions, alcoholysis and ester exchange, formation in situ of Al soaps, synthesis of higher alkoxides, chelates, ocylates. Aceto Chem.

42) **ALUMINUM ISOPROPYLATE** — Tech. BP (7 mm): 145°. Meerwein-Ponndorf reaction catalyst. Uses: formation in situ Al soaps, synthesis of higher alkoxides, chelates, acylates. Harshaw.

43) ***ALUMINUM SILICATE PIGMENT SURFACE-TREATED** — ASP 1300 is an extender pigment for paints and printing inks. Hydrophobic and oleophilic, can be used with polar and non-polar media. Has excellent wet-out, reduced agglomeration, high loadings at min viscosity. Min & Chem Corp.

44) **AMINE ALKYL ARYL SULFONATE** — 95%. Ninate 411 emulsifies petroleum solvents, used in degreasers. Light color. Ninol Labs.

45) ***2-AMINO-2-ETHYL-1,3-PROPANEDIOL** — BP: 152-153°. Comm Solv.

46) **AMMONIA** — Escambia Chemical Corp.

47) **AMMONIA** — Refrigeration grade and commercial grade for chemical uses, soil application. Sun Oil.

48) ***AMMONIA-BASE SULFITE LIQUOR, MODIFIED** — Orzan P comes as powder or 50% soln. A binder in wet process soft and hard boards, emulsion stabilizer and emulsifier, flocculent. Pptd from soln by

aluminum or ferric salts. Crown Zellerbach.

49) *AMMONIUM LIGNIN SULFONATE, IRON COMPLEX — Greenz 26 controls iron chlorosis in plants. Low cost. Crown Zellerbach.

50) AMMONIUM NITRATE — Escambia Chem.

51) ANION-ACTIVE EMULSIFIERS — Emcols H-A and H-B are free-flowing amber liquids for combined liquid fertilizer/liquid pesticide application. Sp gr: 1.01. pH (% aq soln): 6.5. Emulsol.

52) ANION EXCHANGE RESIN, INTERMEDIATE — Has high capacity, thermal and chemical stability. For water demineralization, removal of acids, sugar purification. Chem Process.

53) *ANION EXCHANGE RESIN, STRONG BASE — Type I. Duolite A-101 has high porosity, rapid exchange rate, heat stability. For water treatment, U recovery, sugar demineralization. Chem Process.

54) *ANION EXCHANGE RESIN, STRONG BASE — Type II. Duolite A-102 has high porosity, rapid exchange rate, economical regeneration. For water treatment, sugar demineralization, metal recovery. Chem Process.

55) ANIONIC SURFACE-ACTIVE — Dowfax 2A1 is of the sulfonate type. Uses: for metal and hard-surface cleaning textile processing, paper and petroleum manufacturing. Dow.

56) ANTARATE 9183 — Liquid, oil soluble, anionic/nonionic blended pesticide emulsifier. Gen'l Aniline.

57) *ASTON D — Antistatic finish for synthetic fiber withstands washing with soap or detergent, and dry cleaning. Won't impair mechanical properties of fabric or discolor. Onyx Oil.

58) *ASTON LT — Permanent antistatic finish for synthetic fibers. Comes as 20%-active aq soln and liquid curing agent. Onyx Oil.

59) *BARIUM-CADMIUM ORGANIC COMPLEX — Flomax 25 is a very pure liquid for heat and light stabilization of clear vinyl chloride plastics. Compatible. Has minimum plate out. Nat'l Lead.

60) BARIUM CITRATE — For general chemical use and manufacture of Ba compounds. Sherwin-Williams.

61) *BARIUM PETROSUL, NEUTRAL — Ba salt of a natural high-mw petroleum sulfonic acid. Uses: rust preventative, fuel oil additive, grease additive. Penn Refining.

62) BARON — Usable formulation of 2(2,4,5-trichlorophenoxy) ethyl 2,2-dichloropropionate (erbon), a nonselective herbicide. Dow.

(*Please turn to next page*)

PIN-POINT, by use, the chemical materials you seek. "Use-Index" is on page 44.

MANUFACTURERS' ADDRESSES are on page 94. Contact them for additional details.

REPRINTS of this report are available at $1 a copy, less in quantity.

When inquiring check 2637 opposite last page

new commercial chemicals 63-92

(*Continued from preceding page*)

63) ***BAUXITE, ACTIVATED** — Driocel S is used for "sweet" drying of LPG products and drying chlorinated and fluorinated hydrocarbons. Doesn't act as polymerization catalyst. Has extremely low iron content. Min & Chem Corp.

64) **BENZALACETONE** — 100%. MP: 40.0°. Intermediate. Has perfumery uses. NY Quinine.

65) **BENZOPHENONE** — As an intermediate and in perfumery. NY Quinine.

66) **BETA-CHLOR 33** — An aliphatic, chlorine-bearing additive with exceptional EP lubricating properties. It has good solubility in both solvent-refined and conventionally-refined oils. Uses: for hypoid and industrial gear lubes, cutting oils, grinding oils. It has 33% Cl. Carlisle.

67) ***BISMUTH TITANATE** — 99+%. Promotes advantageous temp coefficients in electronic condensers for TV and radio. Nat'l Lead.

68) **BLANCOPHOR DS-86** — Optical whitening agent for heavy duty detergents. Stable. Gen'l Aniline.

69) **BLANCOPHOR LS-86** — Optical whitener for paper, textiles. Exhausts uniformly. Gen'l Aniline.

70) **BLUE 2BS SALT** — A stabilized diazonium salt. On cotton and rayon, shades vary from greenish to reddish blue with various National Naphthols. Have good fastness. Allied Chem Nat'l An Div.

71) **BRITONE RED M** — A dark, blue resinated Barium Lithol red pigment for rotogravure inks. It is strongest color of its class. Sherwin-Williams.

72) ***BROMOFORM ADDUCT OF TRIALLYL PHOSPHATE** — BAP Pyrotard Emulsion is a durable flame proofing agent for many synthetic fabrics. Non-toxic. Scientific Oil Comp.

73) ***BUTADIENE-ACRYLONITRILE COPOLYMER** — Colloidal dispersion in water for fabric and paper sizes and coatings, carpet backings. Good UV-light resistance. Chemigum Latex 247. Goodyear Chem Div.

74) **BUTADIENE POLYMERS** — Butarez series. Have viscosities of 1500 and 2500 SVF at 100°F. Uses: Smokeless paint or varnish additive, casting resin, electrical insulation. Phillips.

75) **BUTADIENE-STYRENE COPOLYMERS** — Cold polymerized elastomers containing high potency staining antioxidant, for camelback, tires, and rubber goods that are not light colored. Plioflex 1500. When extended with 37½ parts of highly aromatic oil, it is identified as Plioflex 1712. Goodyear Chem Div.

76) ***BUTADIENE-STYRENE COPOLYMERS, OIL-EXTENDED** — Extremely light colored, exhibits minimum staining in finished goods. For making gen'l rubber products. Plioflex 1773 is 25% oil-extended; 1778 is 37½% oil-extended. Goodyear Chem Div.

77) **BUTYL ACID PHOSPHATE** — Mixture, urea-formaldehyde catalyst. Exc color. V-C Chem.

78) **BUTYL DECYL PHTHALATE** — Plasticizer #710 offers optimum compromise between cost and performance in vinyl resins. Reichhold.

79) **BUTYLATED HYDROXYTOLUENE** — Tenox BHT is free-flowing, non-dusting. As poultry feed additive. Eastman Chem.

80) ***n-BUTYLISOCYANATE** — BuNCO. 90+%. BP: 113-116°. For waterproofing textiles and proteins. For

synthesis of ureas and urethanes. Reacts with matl having activated hydrogen atoms. Carwin.

81) *CADMIUM METAL — 99.9% Reagent. Iron 0.001%, copper 0.005%, lead 0.017%. Fisher Sci.

82) *CALCIUM CARBONATE — Primary standard AR. Controlled to assay of 99.95-100.05%. Mallinckrodt.

83) *CALCIUM CHLORIDE, FLAKED — Easy to handle. For thawing, dust control, dehydrating. High purity. Columbia-Southern Chem.

84) *CALCIUM HYPOCHLORITE, TABLETS — Pittabs are slow-dissolving, offer 18-hr protection for sanitation of swimming pools, water mains, reservoirs. Columbia-Southern Chem.

85) *CALCIUM PETROSUL, NEUTRAL — Ca salt of a natural petroleum sulfonic acid of high mw. Uses: rust preventatives, fuel oil additive, grease additive. Penn Refining.

86) *CALCIUM SILICATE, HYDRATED SYNTHETIC — Micro-Cel offers high absorption, small particle size, low bulk density. Is a carrier-absorbent for insecticides, anticaking agent for detergent cleansers, flatting agent for paints, pigment extender for paint, paper, rubber, plastics. Johns-Manville.

87) CAPRIC ACID & METHYL CAPRATE — Identified as Aliphat 3 and Uniphat A-30, respectively. Both have high purity, good color stability and are intermediates for plasticizers and stabilizers. Gen'l Mills Chem Div.

88) CAPRYLIC ACID & METHYL CAPRYLATE — Identified as Aliphat 2 and Uniphat A-20, respectively. Both have high purity, good color stability and are intermediates for plasticizers and stabilizers. Gen'l Mills Chem Div.

89) CARBANTHRENE DIRECT BLACK 3G DBL. PASTE — An anthroquinone vat dye producing greenish-black shades on cotton and rayon. Has max lightfastness in heavy shades. Allied Chem Nat'l An Div.

90) *CARBON, ACTIVATED GRANULAR — Type CAL granular. Has high decolorizing power and adsorption efficiency. For decolorization and purification of sugar solns, chemicals, pharmaceuticals. Pitt Coke.

91) *CARBON BLACK, LOW RESISTIVITY — Vulcan® XC-72 is an oil furnace carbon black that has extremely low electrical resistivity, a high degree of particle "chain structure," good heat transmission qualities, small particle size, and large surface area. Uses: in antistatic and highly conductive rubber and plastics compounds, in greases as a thickening agent, and in the depolarizing mix of dry cell batteries. Cabot.

92) 2-CARBOXY-2'-HYDROXY-5'-SULFOFORMAZYLBENZENE — Zincon reagent. Chelatometric indicator for zinc. J. T. Baker.

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Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
Temperatures are in °C
Solubilities are at room temperature

When inquiring check 2639 opposite last page

new commercial chemicals 93-122

(*Continued from preceding page*)

93) *CATALYST G-43 — Catalyst has high activity at low cost for hydrogenation and for deoxidizing gases. Girdler.

94) *CATALYST G-46 — For removal of highly unsaturated impurities from olefins. Girdler.

95) CATIONIC RESINOUS COMPOUND — Solidogen LT-13 is fixing agent for textiles, leveling agent in leather dyeing, minimizes bleed of acid color calender stains in paper making. Gen'l Aniline.

96) *CATIONIC SURFACE-ACTIVE AGENT — Alkaterge®-T is oil-sol. Corrosion inhibitor, emulsifying agent, defoaming agent, pigment grinding assistant. Comm Solv.

97) CELLU-BRITE is an optical bleaching agent that whitens and brightens textiles, high grade white papers, and other materials. It is substantive to cellulose fibers and can be incorporated into soaps and detergents. Powder form. Carlisle.

98) CERIUM TITANATE — 99+%. In conjunction with other titanates, produces high dielectric constants and capacity in electronic condensers for TV and radio. Nat'l Lead.

99) *CHITIN, DEACTYLYTED — 100%. Kylan is used for wool shrinkage control, dyeing aid. Is emulsifier and stabilizer for cosmetics, water-based paints, water proofing. Moretex.

100) *3 (p-CHLOROPHENYL)-1,1-DIMETHYLUREA — SU-101 is curing agent for epoxy resins, has long pot life, low toxicity. DuPont Grasselli.

101) CHROMIC PHOSPHATE — Gives rust inhibition in one-package vinyl-type metal conditioning primers. Ky Color & Chem.

102) COBALT-MOLYBDIC OXIDES — Catalysts G-35A and G-35B are for hydrodesulfurization. Have high activity. Girdler.

103) COLOR CONCENTRATES — For plastics and rubber. Colors flushed in low-mw polyethylene are nondusting solids that melt easily at processing temp. FL-439 is dispersed benzidine yellow, FL-440 is phthalocyanine blue (green shade), and FL-441 is phthalocyanine blue (red shade). Sherwin-Williams.

104) COLORS FLUSHED IN GEL VARNISH — For printing inks. Gives quick dry, high gloss, no smudge on offset presses. Benzidine Yellow, Lithol Rubine, Phthalocyanine Blue, and Alkali Blue. Sherwin-Williams.

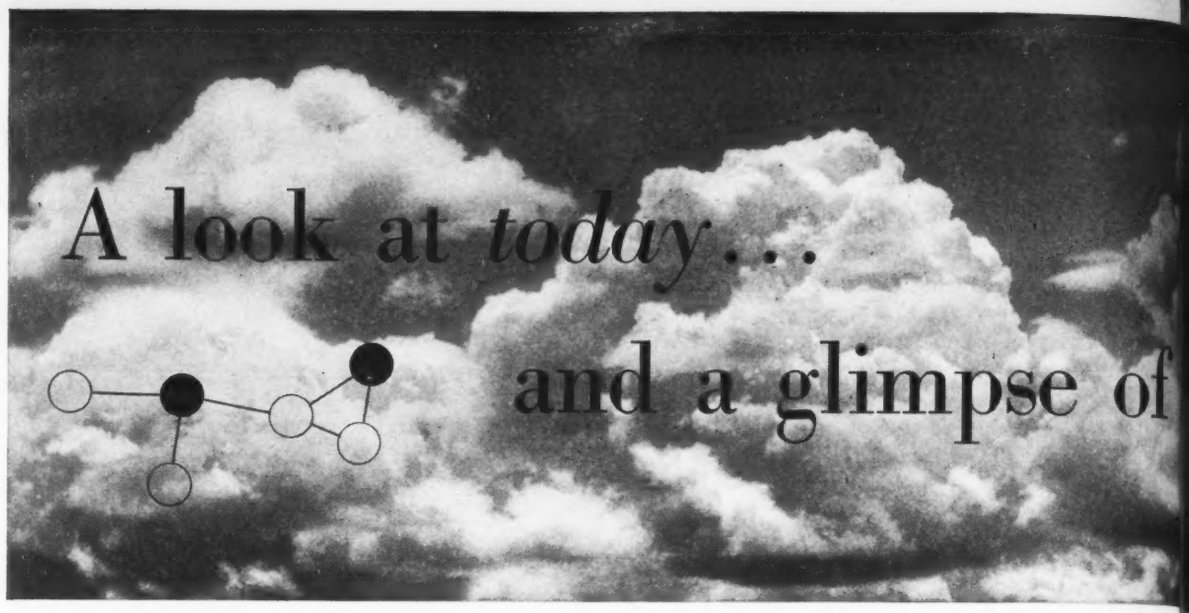
105) COPOLYMER EMULSION — Arolon 110 is prepared by emulsion polymerization of highly reactive synthetic and oil-based monomers. 46% solids. Vehicle for water-thinned interior paints. Has water resistance, smallest particle size, exc adhesion. A-D-M.

106) COPOLYMER LATEX — 9120 Wallpol in surface coatings gives high pigment binding, excellent water resistance, low-temp coalescence, permanent flex, good thermal stability, film integrity and durability. Reichhold.

107) *COUPLER — Witco 77-86 for production of urethane foams where low odor level is required in finished foam. Witco Chem.

108) *CUNIMENE D-2747 — Synergized Rosin Amine D plus Dowicide. A liquid preservative for latex paint. Scientific Oil Comp.

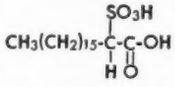
109) *CUNIPHEN 2778-I — Synergized dihydroxydi-



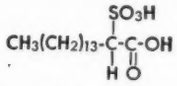
To keep you informed of the latest chemical developments, the Armour Chemical Division presents an insight into new products that well may fit into your current or future research.

1. A Glimpse of Tomorrow—

SULFO ACIDS



Alpha-sulfostearic acid



Alpha-sulfopalmitic acid

The Armour Chemical Division is the first to offer pilot plant quantities of two new alpha-sulfoalkyl acids derived from stearic and palmitic acids. The polyfunctionality of these acids indicates an unlimited future for them.

Evaluations, to date, show these acids lend themselves to ore flotation; detergents; butadiene-styrene polymerization; fuel and lube oil additives; grease additives and thickeners. They're ideal as chemical intermediates for mono- and di-salts, esters, amides, mixed functional groupings and many more applications.

PHYSICAL CHARACTERISTICS

Alpha-Sulfo Alkyl Acid	Melting Point Range °C	Molecular Weight	Specific Gravity	Color, Gardner (17% aqueous solution)
PALMITIC	84—87	340	0.95	6—7
STEARIC	91—94	365	0.95	14

The acids are 100% active, soluble in water and in various organic solvents. The extent of solubility at 30°C is indicated in the following table:

SOLUBILITY Gm/100 Gm @ 30°C						
Alpha-Sulfo Alkyl Acid	Water	iPrOH	Skelly B	$CHCl_3$	EtAc	Acetone
PALMITIC	25	100	1	7	22	125
STEARIC	13	64	1	5	17	83

2. A Look at Today—

ARMEENS® O AND OD

These new Armour liquid fatty amines, derived from oleic acid, are now commercially available. They may be just the long chain cationic chemicals you're looking for. By Stedman composition they are 88% oleyl amine—with a *low* solidification point and *high* primary amine content.

Armeens O and OD are soluble in almost all common organic solvents, except the glycols. They allow wide latitudes in usage or formulation and offer promising possibilities in quaternary production, corrosion inhibition, flotation processes, fuel oil additives, disinfectants or chemical intermediates.

AVERAGE PROPERTIES

	Primary Amine	Secondary Amine	Pour Point	Solidification Point
ARMEEN O	89%	6.2%	35°F	45°F
ARMEEN OD	98%	1.5%	60°F	55°F

3. A Look at Today—

EMULSIFIER 1990-A

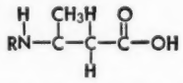
Armour Chemical Research has developed a cationic surface active agent specifically for the emulsification of pentachlorophenol. We call it Emulsifier 1990-A.

The most unique property of this new chemical is "flash" dispersion of the emulsifiable concentrate upon addition to water. Emulsifier 1990-A produces stable emulsions in hard or soft water. Concentrates containing up to 15% pentachlorophenol can be easily prepared using only 3 to 5% 1990-A and there is no precipitation of pentachlorophenol in the emulsifiable concentrate. Because of these properties, this new cationic should be useful for emulsification of other phenols and chlorinated aromatic compounds.

4. A Look at Today—

ZWITTERION

If you are formulating chemical specialties or contemplating research in this field, here is a chemical that offers great promise—Zwitterion. Chemically Zwitterion looks like this:



N—coco beta amino butyric acid

Because it contains an amine group and a carboxyl group, the Zwitterion may act as a cationic or anionic agent. The amine group is attracted by negatively charged surfaces and this fact has potential value for corrosion inhibition, pigment dispersion, bactericides, emulsification or demulsification.

Salt formation with the carboxyl group offers interesting possibilities. If you want strong cationic activity, try forming a salt with a fatty diamine. Use the alkaline salts as dispersants. For a suds control agent, try the sodium salt.

Perhaps your research and imagination can give you additional clues to your own profit-making chemical specialty.

If any of our new products have application in a formulation you are planning or producing, send the coupon for detailed information and product samples.

ARMOUR CHEMICAL DIVISION

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Leader in Progressive Fatty Acid Chemistry

NEWS FROM THE "NEW IDEA" SECTION

An Armour group you ought to know

by Karl Bierman, Manager, Market Development Department

It started in 1951.

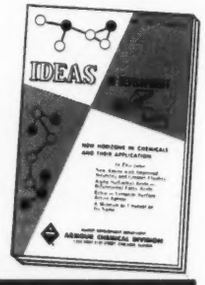
New developments in fatty acid chemistry had been coming fast and the field was growing rapidly. Even to stay abreast with the changing times was not easy. To maintain a leading role in the industry would take special measures indeed.

So, Armour created a service force—the Market Development Department (more commonly referred to today as the "New Idea" Section). Its purpose: sift through the flood of new ideas, then speed work on the good ones. To accomplish this end, the Department would work with the laboratory, the sales force and especially with outside industry.

We staffed up with experts. Men like Vance Gregory (who received a patent on fatty diamine salts as corrosion inhibitors); Jim Prescott (who has done outstanding field work with Sulfo Acids); Charlie Blaich (who is helping discover new uses for dibasic acids); and Ed Swensen (who is currently heading up Zwitterion development).

As a result, our Armour "New Idea" Section has usually been close at hand wherever progressive fatty acid chemistry uncovers something new and startling. We were pioneers in flotation reagents. We helped develop petroleum additives. We helped set up standards for corrosion inhibitors and bactericides in oil production. And at present, we're right in the middle of a number of projects which I'm sure will be of vital interest to you in the near future.

Our "Idea" staff stands ready to help you. Perhaps one of our new or more established chemicals can help solve a problem you're facing right now. That's what we're here for. So why not drop us a line? And when you write, be sure to request your copy of our new periodical, "Ideas In Development."



☐ **Send me a copy of "Ideas in Development."**

☐ **Send Samples and further information on:**

☐ Sulfo Acids ☐ Emulsifier 1990-A

☐ Armeens O & OD ☐ Zwitterion CP4

NAME _____ TITLE _____

FIRM _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

MARKET DEVELOPMENT DEPARTMENT

Armour Chemical Division • 1355 West 31st St. • Chicago 9, Illinois

chlorodiphenyl methane is a preservative for adhesives. Non-toxic, it is approved for milk carton adhesives. Scientific Oil Comp.

110) **CUPROUS CHLORIDE** — 99%. Catalyst for making acrylonitrile. Ingred in making phthalocyanine pigments. Metalsalt.

111) ***CYCLICIZED RUBBER** — Alpex, MP: 145-155°. 100% solids for inks, coatings. Chem and temp resistant. Compatible with drying oils, alkyds. Alkydol Labs.

112) **CYCLOHEXANE** — 98%. BP: 80-81°. Uses: solvent, chemical intermed. Phillips.

113) **CYCLOPENTYLPROPANOIC ACID** — Tech. BP (12 mm): 130-132°. Arapahoe.

114) ***CYSTEINYLGLYCINE** — Crystalline product. For biochemical research. Schwarz Labs.

115) ***CYTIDINE 2':3'-CYCLIC PHOSPHATE, Ba** — For biochemical research. Schwarz Labs.

116) ***DEFOAMER 54** — Liquid, non-toxic. Foam control for latex-emulsion paints. Low cost. Swift.

117) ***DEFOAMER 67-A** — Liquid. Control sewage foams. Efficient, low cost. Swift.

118) **DEFOAMERS** — Witco 2A and 3 are used in paper making to prevent formation of foam and to destroy existing foams to yield a paper free from air voids. Witco Chem.

119) ***DEHYDROACETIC ACID** — 97.5% min. Also Na and Ca salts. Reduces enzyme activity in mouth, prevents molding, effective against athlete's foot fungi, inhibits fungi on cosmetic and food wrapping papers. Aceto Chem.

120) **DETERGENTS, CONCENTRATED BLEND** — Scourall is for scouring and boil-off for textiles. Stock solns are easy to prepare. Onyx Oil.

121) ***DIALLYL ADIPATE** — Mid BP (4 mm): 135°. A polymerizable monomer. Intermediate for cross-linking agent. Polymer has chem resistance, good electrical properties. Ohio-Apex.

122) ***DIALLYL DIGLYCOLATE** — Mid BP (4 mm): 135°. A polymerizable monomer. Intermediate for cross-linking agent. Polymer has chemical resistance, good electric properties. Ohio-Apex.

(*Please turn to next page*)

PIN-POINT, by use, the chemical materials you seek. "Use-Index" is on page 44.

MANUFACTURERS' ADDRESSES are on page 94. Contact them for additional details.

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For more information on product at left, specify 2640 . . . see information request blank opposite last page.

new commercial chemicals 123-144

(*Continued from preceding page*)

123) **3-3'-DIAMINOBENZIDINE HYDROCHLORIDE** — Reagent for analysis of copper and ferrous alloys. Controlled selenium sensitivity. J. T. Baker.

124) ***4,4'-DIAMINODIPHENYLSULFONE** — 97+%. Chem intermed. Makes curing agent in epoxy resins. Abbott.

125) **DIBUTOXYETHYL ADIPATE** — Plasticizer #779 is used in making polyvinyl butyral inner layer for safety glass. Other uses: low-temp synthetic rubbers, low viscosity plastisols. BP: 209°. Reichhold.

126) **DIBUTYL FUMARATE** — In copolymerization of vinyl chloride acetate and in internal plasticizing of PVAc emulsions via copolymerization. Designated Plasticizer #774. Reichhold.

127) **DIBUTYL FUMARATE** — NY Quinine.

128) **DI-n-BUTYL MALEATE** — BP: 272-276°. For copolymers, plasticizers, as intermediate. NY Quinine.

129) **DI-n-BUTYL SUCCINATE** — Intermediate. NY Quinine.

130) ***DICYCLOHEXYLCARBODIIMIDE** — 99.9+%. MP: 35°. Prep of peptides. Can be used in water. Aldrich Chem.

131) **DICYCLOPENTADIENE** — 95%. BP: 160-170°. For insecticides, drying oils, resins. Percursor of low priced, reactive monomer. Enjay.

132) **DICHLORODIFLUOROMETHANE** — Isotron 12 is used as a refrigerant and propellent. PennSalt.

133) ***3(3,4-DICHLOROPHENYL-1,1-DIMETHYL UREA)** — SU-102 is curing agent for epoxy resins. Low toxicity. BP: 148-152°. DuPont Grasselli.

134) **DIDECYL ADIPATE** — Plasticizer #777 has low volatility, good low-temp properties. Reichhold.

135) **DIETHYL MALEATE** — BP: 219-220°. Intermediate. NY Quinine.

136) **DIETHYL SUCCINATE** — 99%. BP (30 mm): 120°. Plasticizer, intermediate. NY Quinine.

137) **DIISOOCTYL SEBACATE** — Plasticizer #760 gives low-temp flex to vinyl resins, synthetic rubbers. BP (4 mm): 252°. Reichhold.

138) **2,5-DIMETHYL HEXADIENE-1,5** — 98.6%. BP: 112-115°. NY Quinine.

139) **2,5-DIMETHYL HEXADIENE-2,4** — 91% pure by UV. BP: 133-135°. NY Quinine.

140) ***DIMETHYL POLYSILOXANE COMPOUND, EMULSIFIED** — Antifoam B for defoaming aq systems. Water-dispersible, rapid acting, stable. Dow Corning.

141) **DIMETHYLAMINO PROPYLAMINE** — BP: 136.5°. Catalyst for epoxy resins. Makes amides for cationic surface-active agents. Forms fatty acid soaps, quaternary ammonium salts. Carbide & Carbon.

142) ***3,3-DIMETHYLANILINE** — 98+%. MP: 48°. Drug intermed. Aldrich Chem.

143) ***DIMETHYLFORMAMIDE** — Reagent. Solvent in chromatography, non-aqueous titrations. Fisher Sci.

144) ***N,N'-DI-3-(5-METHYL HEPTYL)-p-PHENYLENEDIAMINE** — Tenamene 31 retards deterioration

(*Please turn to page 55*)

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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Trimethyl and Triethyl Aluminum Piloted by U.S.I.

Trimethyl and triethyl aluminum, highly flammable liquids which ignite spontaneously in air, are now being produced by U.S.I. in pilot plant quantities. At present they are being tested as ignitors and fuels for ram jet and turbo jet engines, and also show possibilities as polymerization catalysts, and intermediates for chemical synthesis.

A sodium-based process is used to synthesize these two materials in the pilot plant, a process which can be used to produce them in commercial quantities as well. It is predicted that the commercial price will range between $2 and $5 per pound, although the price in pilot quantities is considerably higher.

Also available from the pilot unit is methyl aluminum sesquichloride, a mixture of methyl aluminum dichloride and dimethyl aluminum chloride. This product too may find use as a catalyst or chemical intermediate.

Alcohol and Chemical Sales Now Under Johnson

Warren E. Johnson has been named Manager of Alcohol and Chemical Sales for U.S.I. Mr. Johnson has been with the U.S.I. sales organization since 1940. He became Manager of the Boston Sales Division in 1944 and Manager of U.S.I. Chemical Sales in 1950. With this change, Mr. Johnson becomes responsible for industrial alcohol sales in addition to his previous product responsibilities. U.S.I. alcohol sales had formerly been under Alden R. Ludlow, Jr., who was recently named Director of Sales for the company.

Byck Appointed Manager of U.S.I. Heavy Chemical Sales

Lawrence C. Byck, Jr., has been named Manager of Heavy Chemical Sales for U.S.I. He has been assistant to the Manager of Chemical Sales during the past four years, and has been with the U.S.I. organization since 1945, in research and technical liaison positions as well.

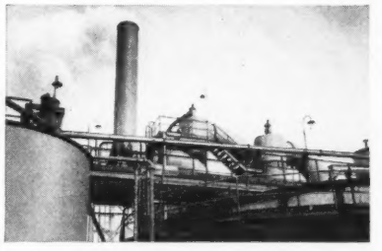
In his new position, Mr. Byck will be responsible for sales of ammonia, nitric acid, and nitrogen solutions from the U.S.I. synthetic ammonia plant at Tuscola, Illinois. He will also be responsible for sulfuric acid sales from U.S.I.'s three plants at Tuscola, Illinois, Dubuque, Iowa and Sunflower, Kansas, and for sales of phosphoric acid from U.S.I.'s newly completed wet-process plant at Tuscola.

U.S.I. Phosphoric Acid Plant At Tuscola is Now Onstream

Plant is First in Country to Produce Wet-Process Acid Exclusively for Solid Fertilizer Industry

Thirty thousand tons per year of phosphoric acid (measured as P_2O_5) are now being produced at U.S.I.'s new Tuscola, Illinois plant. The bulk of the acid is expected to be used by solid fertilizer manufacturers in the Mid-west, making this the first wet-process phosphoric acid plant in the country to produce for non-captive consumption only. Availability of phosphoric acid in this area answers the need for a rich source of phosphorus, a need which has become evident with the trend toward high-analysis plant foods.

In the plant, insoluble phosphate rock is digested with spent sulfuric acid from the neighboring facilities of National Petro-Chemicals Corporation, a subsidiary of U.S.I. Calcium sulfate is filtered off and the resulting phosphoric acid is concentrated and marketed as a fertilizer raw material.



Section of U.S.I.'s new phosphoric acid plant.

With the completion of this plant, U.S.I. now makes ammonia, nitrogen solutions, sulfuric acid, and phosphoric acid at Tuscola. Because this area is the site of an integrated chemical center, the company feels that it can also manufacture other fertilizer raw materials if the demand becomes evident.

MORE

April 8-12 Set for 4th Chemical Progress Week

The Manufacturing Chemists Association (MCA), national sponsor of Chemical Progress Week, reports that industry support for the program is greater this year than ever before.

Chemical Progress Week was inaugurated in 1954 as a nationwide effort on the part of the Chemical Process Industries to acquaint the American public with the importance of chemistry and the chemical industry in daily life.

As has been the case in previous years, the working organization behind Chemical Progress Week is manned by volunteers from the industry. Last year some 1,500 participants were listed at National Headquarters and it is believed that approximately 7,500 additional people took an active part in implementing the program.

National Headquarters has prepared a wide range of materials and suggestions for participating companies to present to the public. Included are literature, displays, ads, radio and TV material, speeches, films, publicity releases and sample proclamations to be made by state governors.

Complete kits of ideas, samples and order forms can still be obtained from MCA, 1625 Eye Street, N.W., Washington 6, D. C.

New, Low-Cost Process for Separating Zirconium and Hafnium Acquired by U.S.I.

U.S.I. has taken an exclusive option on a new process for separating hafnium from zirconium chloride, developed by the Commonwealth Scientific and Industrial Research Organization of Australia. The separation is necessary where zirconium is to be used in atomic energy installations, since hafnium impurities destroy the excellent nuclear properties of zirconium.

Now in pilot plant stage at U.S.I.'s Cincinnati research laboratories, the process has been found to reduce considerably the cost of separating the two metals. It eliminates the series of cumbersome chemical extraction steps which other methods in current and projected operation employ.

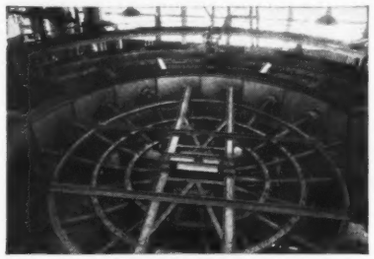
U.S.I. is currently building a zirconium sponge plant in Ashtabula, Ohio, scheduled to come on-stream during the second quarter of 1957.

U.S.I. CHEMICAL NEWS

CONTINUED *Phosphoric*

Sodium Silicofluoride Produced

Sodium silicofluoride is manufactured as a by-product of the phosphoric acid process. This material is used in fluoridation of municipal water supplies and is also employed by the chemical process industries in the manufacture of enamel frits and laundry sours.



Giant filter is heart of phosphoric acid process at U.S.I.'s new Tuscola, Ill. plant.

New Cancer Studies Show Tumor Growth Reduced by Methionine and Cystine

Researchers investigating the biochemistry of cancer report that methionine and cystine, two sulfur amino acids, have been used to reduce the growth of sarcoma R-1 in experimental animals maintained on sulfur deficient semi-synthetic diets. These compounds also increased body weight as normal tissue, raised food efficiency, as well as increasing the difference in the ratio of normal tissue weight to weight of the tumor.

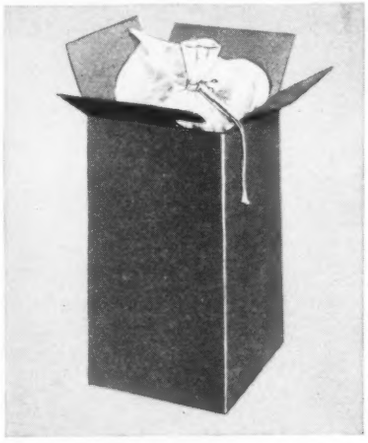
When guanidoacetic acid (glycocyamine) or glycine were used as further supplements, the addition of methionine overcame the toxicity of glycocyamine and brought about increased food efficiency and a favorable change in the ratio of body weight to tumor weight. The mixture of methionine and guanidoacetic acid was particularly effective in conserving body nitrogen under stress conditions such as the large sarcoma or toxic chemotherapeutic agents.

New Type Polyethylene Film Permits Packaging Liquids In Cardboard Containers

A new pinhole-free type of polyethylene film for liners has just been announced which will make it possible to ship liquid, semi-solid and anhydrous products in bags and boxes as well as drums and barrels. It is claimed that the new film gives positive protection against leakage.

The film is made by fusing together two simultaneous draws of polyethylene while the surfaces are still molten. Since it is almost impossible for pinholes or minute weaknesses to occur in exactly corresponding positions in each of two separate films, the result is a strong, moisture-proof material.

Pinhole-free polyethylene has great possibilities as a lining material for all types of shipping containers—to transport chemicals, dairy products and many other items.



This new container combines a pinhole-free polyethylene bag and a corrugated box. Containers of this type should be of interest for packaging liquid chemical specialties.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing the Editor, U.S.I. Chemical News.

New "blackboard" radiographic method is claimed to be fast and low-cost for industrial x-ray work. Advantages cited include: dry process, reusable plates, detailed images, and 20 to 45 seconds exposure-to-viewing time. **No. 1210**

Paint formulas are featured in new 46-page booklet on pigment extenders, flatting agents and filter aids. Presented on individual, 3-hole punched sheets are 24 formulas for solvent-thinned paints and 17 for water types. **No. 1211**

Imported crystal lattice models now distributed here have angles and dimensions based on data obtained by x-ray and electron diffraction. Linear scale is one Angstrom per 25 mm. Spheres have 20 mm diameter, are varied colors. **No. 1212**

Chemicals which can be piped through flexible polyethylene are charted in an 8-page bulletin on this type of piping. Also covered are properties of polyethylene pipe, sizes, estimated flow rates and installation procedures. **No. 1213**

New arsonosiloxanes are claimed to combine the water-repellent properties of conventional silicones with the fungicidal and pesticidal properties of arsenicals. Suggested for use as water-repellent insecticides. **No. 1214**

Chemically-modified fats known as acetoglycerides have been prepared and patented by the USDA. Some are flexible, wax-like, non-greasy in feel—show promise in foods, plasticizers, cosmetics, lubricants. Process can be licensed without cost. **No. 1215**

New one HP homogenizer said to do jobs usually entrusted to 3 to 5 HP models is now on the market. Designed to process about 1000 lbs. per hour of semi-pastes or other viscous materials up to 30,000 cps, at 3600 rpm. **No. 1216**

An index of all isotopes available commercially, and their sources, can be purchased as a 64-page book listing over 2000 items. Included are stable and radioactive isotopes and hundreds of isotope-labeled compounds. **No. 1217**

1,1,1-Trichloroethane in reagent grade is now available as high-safety chlorinated solvent for the laboratory. Suggested as substitute for chloroform or carbon tetrachloride in dithizone tests for metals because of low toxicity. **No. 1218**

o-Nitrophenyl-beta-D-galactoside of especially high purity can now be obtained which permits a dependable, simple assay of the activity of galactosidase used in studies of protein synthesis. **No. 1219**

PRODUCTS OF U.S.I.

INORGANIC CHEMICALS:

Sodium, Metallic: cast solid in tank cars, steel drums, pails; bricks in barrels, pails.
Chlorine: liquid, in tank cars.
Caustic Soda: 50% liquid, in tank cars.
Sodium Peroxide: dust-free granules, in drums.
Sodium Sulfate
Sulfuric Acid: all strengths, 60° Baumé to 40% Oleum. Also Electrolytic grade to Federal specifications. Tank cars or tank wagons.
Phosphoric Acid
Ammonia: Anhydrous, commercial and refrigeration. Tank cars or tank wagons.
Nitrogen Fertilizer Solutions
Ammonium Nitrate: 83%

OTHER PRODUCTS:

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl, Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.
PETROTHENE® Polyethylene Resins.
Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone, Diatol®.
Intermediates and Fine Chemicals: Acetoacetarylides, Dimethyl Hydrazine, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Chloride, Ethyl Sodium Oxalacetate, U.S.I. ISOSEBACIC® Acid, Methyl Hydrazine, Sodium Ethylate Solution, Triethyl Aluminum, Trimethyl Aluminum, Urethan USP (Ethyl Carbamate).
Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay B-G® 80, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B_{12} and Antibiotic Feed Supplements, Vacatone® 40, Vitamin A, D_3 and K_3 Products, Antioxidant (BHT) Products, Special Mixes.
Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.
Metals: Titanium Sponge, Zirconium Sponge, Zirconium Platelets, Hafnium Oxide, Hafnium Sponge.

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new commercial chemicals
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(*Continued from page* 54)

and cracking of rubber products due to ozones. Eastman Chem.

145) **DIMETHYLHYDRAZINE, UNSYMMETRICAL** — 99+%. Dimazine is a powerful reducing agent, has high shock and thermal stability. Uses: aviation fuel, rocket propellant, antiskinning agent for paint, oxygen scavenger, separation of acidulous gases. Westvaco Chlor-Alkali Div.

146) **DINONYL PHTHALATE** — For vinyl plasticizers. Excellent permanence, low color. Eastman Chem.

147) **DIOCTYL ADIPATE** — Plasticizer #776 for processing heavy gage vinyl films and extruded vinyls for low-temp service. Its plastisols retain viscosity in storage. Reichhold.

148) ***N,N'-DI-2-OCTYL-p-PHENYLENEDIAMINE** — Tenamene 30 retards deterioration and cracking of rubber products due to ozones. Has exc resistance to heat aging. Eastman Chem.

149) ***DIOXANE** — Reagent. BP: 101°. MP: 11°. Vapor is harmful. High-purity solvent for dyes, organics, lab analyses. Iron and heavy metals 0.0001%. Fisher Sci.

150) **DIPHENYL-4-PYRIDYL CARBINOL** — MP: 236-241°. White solid. Very weak base. Sl sol: methanol, ether, acetone, ethyl acetate, benzene. Sol: hot glacial acetic acid. Reilly Tar.

151) **DIPHENYL-4-PYRIDYL METHANE** — BP (20 mm): 234°. FP: 123.0° min. White to pale yellow crystalline. Mod sol: common organics. Reilly Tar.

152) **DI-n-PROPYL MALEATE** — BP: 245-248°. Intermediate. NY Quinine.

153) **DISODIUM ETHYLENEDIAMINE TETRAACETATE, DIHYDRATE** — 99.0+%. Crystalline powder has <0.005% heavy metals, <0.010% Fe. Forms stable complexes with polyvalent metallic ions. J.T. Baker.

154) **DISODIUM METHYL ARSONATE** — Selective herbicide for crab grass control. Ansul.

155) **DME & DMS** — Nonionic surface-active agents for use in well drilling fluids. Will help open up oil reservoirs too deep and too hot to be reached by conventional drilling methods. Gen'l Aniline.

156) ***DYLEX PAINT LATEX** — K34 for water-base paints. Has good bond, stain removal, storage stability, freeze-thaw resistance. Koppers.

(*Please turn to next page*)

Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
Temperatures are in °C
Solubilities are at room temperature

For more information on product at left, specify 2642 . . . see information request blank opposite last page.

new commercial chemicals 157-189

(*Continued from preceding page*)

157) *DYLEX PAPER LATEX — K52 gives improved printability when coated on paper. Koppers.

158) EDTA ACID AND SALTS — Ethylenediaminetetraacetic acid and its salts are chelating agents for use in water softening, cleaning compounds, detergents, metal treatment, secondary recovery, anti-chlorosis, stabilizers, synthetic resins and fibers, and processing of rare metals. Agents are extra pure. Maas Chem.

159) *ELECTROSOL — #388 permanently destaticizes PVC and PVA plastics. Agent is a complex condensation product, melts at 5°. It is good stabilizer up to 160°. Alframine.

160) EMULSIFIER 7-71 — Emulsifier for kerosene. Mona.

161) EPOXIDIZED POLYMERIC — Epoxidol 780 is a light-colored plasticizer that stabilizes against heat and light in vinyl plastics. Reichhold.

162) *EPOXY RESIN, LIQUID — Epi-Rez 507 Resin has low viscosity, exc flex and impact resistance in cured compounds. For encapsulations, pottings, castings, adhesives, laminations. Toxic. Liquid at room temp. Jones-Dabney.

163) EPOXY RESINS — Araldite resins 6071, 6084, 6097, 6099, and 6005 are used for paints, tooling applications, electrical potting, laminates, adhesives, and as intermediates. They have excellent adhesion and chemical resistance. Ciba Plastics Div.

164) *EPOXY RESINS — Series for corrosion-resistant coatings, air drying or baking. Bakelite.

165) ERICHROME BLACK T — Reagent. Sodium 1-(1-hydroxy-2-naphthylazo)-6-nitro-2-naphthol-4-sulfonate. Indicator for determination of Ca, Mg, Zn, Pb, Mn, Ni, Co, Cu, Fe, Cr. J. T. Baker.

166) *ETHOXYLATED FATTY ALCOHOLS — With various mol ratios of ethylene oxide. Siponic E Series. Textile uses: acid scouring and fulling, softeners and emulsifiers for finishes. Paint: pigment dispersants, latex stabilizers. Cosmetics: emulsifiers. Stable over wide pH range. Am Alcolac.

167) ETHYL ACID PHOSPHATE — Mixture. Polymerization catalyst, soldering flux. Exc color. V-C Chem.

168) ETHYL CHLOROFORMATE — 95%. BP: 92°. Has a highly reactive chloride group. Makes flotation reagents, dyestuffs, pharmaceuticals. Organic Chem Div FMC.

169) ETHYL-3-OXO-6-HEPTANOATE — 95.8%, by saponification. NY Quinine.

170) ETHYLENE CARBONATE — A solvent and spinning soln for certain synthetic fibers. Dow.

171) *ETHYLENE OXIDE-TYPE NONIONIC — Surface-active Synthrapol PWS is detergent for wool and an all-purpose surface-active for industrial use. Arnold, Hoffman.

172) ETHYLENEDIAMINE TETRAACETIC ACID — Reagent. 99.0+%. Crystalline powder. For chelation of ions. J. T. Baker.

173) *EUCALYPTUS OIL, DIVES — 45% (min) piperitone content. Comes from South Africa. For making essential oils, flavors. Aceto Chem.

174) FATTY ALCOHOL SULFATES — Texapon EM

mixture is mostly the sodium salt of a aluryl sulfuric acid ester. 30%-active. Non-toxic. For shampoos. Fallek.

175) **FATTY AMINE CONDENSATE** — Moropon LC is a high efficiency, low cost detergent for cotton, wool, synthetics. Moretex.

176) **FATTY AMINO AMIDE** — Soromine CS compound. Paste, cationic softening agent for textiles. Good color, resists yellowing. Gen'l Aniline.

177) **FATTY NITROGENS** — For use as corrosion inhibitors, petroleum additives, textile conditioners, intermediates. Alamine 221 is a secondary coco amine, Alamine H226 is a secondary hydrogenated tallow amine, Aliquat 221 is dicoco dimethyl ammonium chloride, Aliquat H226 is dihydrogenated tallow dimethyl ammonium chloride, and Diam 26 is N-tallow trimethylene diamine. Gen'l Mills Chem Div.

178) ***FERROUS FUMARATE** — A hematinic. Stable. Toleron has more Fe than other pharmaceutically-used iron salts. Mallinckrodt.

179) **FERROUS SULFATE** — Tech. For municipal water treatment, fertilizer. Steel Chem.

180) ***FLUORESCENT ZINC OXIDE** — A non-toxic, stable, yellow-green additive to plastics, paint, ink. Called Ottalume 2100. Ottawa Chem.

181) ***FLUORESCENT ZnO-MgO** — Ottalume 2115 is a non-toxic, stable, blue-white additive to plastics, paint, ink, false teeth. Ottawa Chem.

182) ***FLUOROCARBON THERMOPLASTIC** — Kel-F 500-F and -R for high temp wire insulation and in pharmaceuticals. Outstanding chemical, electrical, mechanical resistance. Kellogg.

183) **FLUORO-CHEMICAL** — Scotchgard Stain-Repeller for textile finishing. Non-toxic. Has oil and water repellency. 3M Co.

184) **GLYCERINE** — USP. Humectant, plasticizer, etc. Dow.

185) **GLYCERYL TRI-(ACETOXYSTEARATE)** — Paricin 8 plasticizer for PVC, vinyl, nitrocellulose. Non-volatile, stable, non-exuding. Baker Castor Oil.

186) **GUANOSINE** — Chromatographically homogeneous. Biochem research. Schwarz Labs.

187) ***HEPTANE** — Reagent, High purity solvent for synthesis, spectrophotometry, analysis. Fisher Sci.

188) **HEXACHLOROBENZENE** — For control of "stinking smut" and "dwarf bunt." Dow.

189) ***HEXACHLOROPHENE/o-PHENYLPHENOL EMULSION** — Socci 6618 is an emulsion containing 10% of each of these compounds. Non-toxic, it imparts bacteristatic and fungistatic finish to textiles. Is effective through several launderings. Scientific Oil Comp.

(*Please turn to next page*)

PIN-POINT, by use, the chemical materials you seek. "Use-Index" is on page 44.

MANUFACTURERS' ADDRESSES are on page 94. Contact them for additional details.

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190-224

(*Continued from preceding page*)

190) *HEXANE — Reagent. A solvent in high-purity syntheses, spectrophotometry, analysis. Fisher Sci.

191) HYDROCARBON/LIPOCHEMICAL ESTER BLEND — Defoamer #2 is efficient defoaming agent for paper processing. Onyx Oil.

192) HYDROFLUOSILICIC ACID — For fluoridation of municipal water supplies and for production of fluoride chemicals and fluxes. Is cheap and safe to handle, as compared with other fluoride chemicals. H_2SiF_6 content: 25%. FP: — 18°. Int'l Min & Chem.

193) *ILLINI REDS — For printing inks. Yellowish-red shades are valued for their brightness. CP-1264 is dark strong shade, CP-1267 is light transparent shade. Sherwin-Williams.

194) *INOSINE-8-C^{14} — Labeled at C-8. Biochemical research. Schwarz Labs.

195) *INOSINIC ACID-8-C^{14} — For biochemical research. Schwarz Labs.

196) ION EXCHANGE RESINS, CHROMATOGRAPHIC — Amberlite resins for chromatographic analyses. Over 25#: Rohm & Haas. Under 25#: Fisher Sci.

197) ISOASCORBIC ACID — Non-toxic antioxidant for meats, beverages. No vitamin properties. Pfizer.

198) *ISOBUTYRONITRILE — BP: 100-105°. Insecticide intermed. Toxic. Eastman Chem.

199) ISOOCTYL ACID PHOSPHATE — Mixture. Polymerization catalyst, rust inhibitor, antistatic agent. Excellent color. V-C Chem.

200) *ISOCYANATE ADDUCT — Mondur CB. Combines with polyester resins. Makes urethane surface coatings and adhesives. Non-toxic, chemical and abrasion resistant films. Mobay.

201) *ISOCYANATE ADDUCT — Mondur SH. Combines with polyester resins. Makes high-temp resistant urethane wire enamels, possible use in urethane surface coatings. Resists temps in excess of 150°. Mobay.

202) *ISOPHTHALIC — 98+%. MP: 354°. Raw matl for surface coatings and plastics. Makes alkyd resins and modified oils, monomeric and polymeric plasticizers, polyamides, and polyesters. Fast drying, hard, tough films. Low volatility in plasticizers. Polyamides and polyesters are tough and strong. Oronite.

203) ISOPHTHALIC POLYESTER RESIN — Dion DR-01 and DR-03 offer greater strength, better bonding with glass fibers when used in laminates, molding. Chem Process.

204) *KAOLIN CLAY, TREATED — Polyfil Clay gives heat, light stability in PVC flooring. Scratch and scuff resistant. Huber.

205) KELTHANE — Insecticide for control of mites. Tech. Rohm & Haas.

206) *KROMAD — A broad-spectrum turf fungicide. Rel non-toxic. Mallinckrodt.

207) *LAKE RED C — CP-1297 is considerably yellower and brighter, sl darker and more transparent than other pigments of this type. Blends to give variety of red shades in printing inks. Sherwin-Williams.

208) *LAKE RED C — CP-1307 is about 10% stronger

than other non-resinated Lake Red C pigments. Its inks have good body and flow. Also pigments rubber and plastics. Sherwin-Williams.

209) **LAURIC DIETHANOLAMIDE** — 95%. Ninol AA62 Extra is a high activity detergent, foam stabilizer and thickener for liquid dishwashing detergents and shampoos. Ninol Labs.

210) **LAURYL ETHER SULFATE, SALTS** — Non-toxic. For shampoos. Texapon Extracts NA is 24% active ammonium salt, NT is 37% active triethanolamine salt, M is 28% active monoethanolamine salt. Fallek.

211) ***LAURYL ISOQUINOLINIUM CHLORIDE** — 20%. Isothan Q30 is a fungicide, has very low eye irritation. Use in anti-dandruff formulations. Onyx Oil.

212) **LEAD SULFIDE** — Reagent. Fisher Sci.

213) ***LEAD THIOSULFATE** — For use in coating sensitized photo paper used in wire photo reproduction, in match heads. Toxic. Ky Color & Chem.

214) **LECITHIN** — Kelecin comes in fluid and plastic grades, has excellent wetting and emulsifying properties. Uses: surface coatings, inks, caulking compounds, cosmetics, lubes, rubber, and food. Spencer Kellogg.

215) **LEVELON** — Improves gloss and leveling of water-based vehicles, waxes, PVAc emulsions, and other systems. Abco Chem.

216) ***LIGNIN** — Indulin FA for storage battery plates and secondary recovery of petroleum. 99% purity. Much finer particle size, otherwise same as Indulin A. W.Va. Pulp & Paper.

217) ***LIGNIN** — Indulin O has 99% purity. Higher viscosity in alkaline soln than Indulin A. W. Va. Pulp & Paper.

218) **LINSEED OIL** — Extralin raw and boiled linseed oil gives better durability-flow-leveling of paints. Cargill.

219) ***LITHIUM BOROSILICATE** — Tech. MP: about 815°. Set-up agent for aluminum enamels. Acts as enamel flux, allows indefinite storage of slip. Lithium Corp.

220) **MELAMINE-FORMALDEHYDE RESIN** — Super-Beckamine #3555-60 is soluble in aromatics, makes low viscosity, high solids metal finishes of excellent hardness, gloss, chemical resistance. Reichhold.

221) **METHALLYL CHLORIDE** — 95%. BP: 72.2°. Is a fumigant, makes insecticides, copolymers, monomers. Organic Chem Div FMC.

222) ***MENTHOL** — USP racemic. Terpene-derived. Uses: Medicinal and pharmaceutical uses, flavoring, chemical intermediate. Newport Ind.

223) ***MENTHONE** — 95+%. Terpene-derived. Flavor, pharmaceutical, solvent. Newport Ind.

224) **3-METHOXY BUTANOL** — Tech. BP: 161.1°. Solvent, coupling agent, intermediate. Used in brake fluids, esters, lacquers. Has low rubber swell. Is odorless. Celanese.

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Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
Temperatures are in °C
Solubilities are at room temperature

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225) *METHYL ACETOACETATE — 90%. Makes dyestuffs, insecticides, is solvent for cellulose ethers and esters. Aceto Chem.

226) METHYL PARATHION — Tech. For control of boll weevils in areas where resistance has developed to BHC and other chlorinated hydrocarbon insecticides. Is also effective in controlling mites and aphids on cotton and other crops. Velsicol.

227) *β-METHYL-β-ETHYLGLUTARIMIDE — 99.9%. MP: 126°. Antibarbiturate. Lacks toxicity. Aldrich Chem.

228) 2-METHYL-2-n-PROPYL-1,3-PROPANEDIOL — 98%. MP: 57°. For pharmaceuticals, organic syntheses. Organic Chem Div FMC.

229) *α-METHYLSTYRENE MONOMER — 99+% pure. BP: 165.38°. For plasticizers, styrenated alkyds, synthetic elastomers, copolymers, synthetic latices. Low toxicity. Barrett.

230) *MONOCHLOROTRIFLUOROETHYLENE/VINYLIDENE FLUORIDE COPOLYMER — Kel-F Resin 800 has extreme chemical resistance. For lacquer and paint formulations. Kellogg.

231) *MONOCHLOROTRIFLUOROETHYLENE/VINYLIDENE FLUORIDE COPOLYMERS — Kel-F Elastomer Latices 3700 and 5500 for general latex uses requiring outstanding oil and solvent resistance. Kellogg.

232) *MONOMERIC ALIPHATIC COMPOUND — Electrosols D and S-1-X give permanent destaticization, permanent crack resistance and mold release when incorporated into high-pressure (Phillips' process) prior to extrusion or molding. Electrosols M and S-1 have similar effect with low-pressure (Ziegler process) polyethylene. Alframine.

233) *MONOMERIC PHTHALATE PLASTICIZER — Flexol 380 for vinyl chloride resins. BP (5 mm): 241°. Carbide & Carbon.

234) *M-P-A — Thixotropic agent for paints, aliphatic or aromatic systems. Does not change unfavorably in processing or storage. Baker Castor Oil.

235) NALCAMINE G-11 — 80% 1-(2-hydroxyethyl)-2-coco-2-imidazoline. MP: 55-74°. Has exc heat stability. Uses: emulsification, corrosion inhibition, bactericide, makes cationic surface-actives, quaternaries. Nat'l Aluminate.

236) *NALCAMINE G-12 — 80% mixed 1-(2-hydroxyethyl)-2-heptadecenyl and heptadecadienyl-2-imidazoline. MP: −31°. Has exc heat stability. Uses: emulsification, corrosion inhibition, bactericide, makes cationic surface-actives, quaternaries. Nat'l Aluminate.

237) NALCAMINE G-13 — 80% 1-(2-hydroxyethyl)-2-heptadecenyl-2-imidazoline. MP: −36°. Has exc heat stability. Uses: emulsification, corrosion inhibition, bactericide, makes cationic surface-actives, quaternaries. Nat'l Aluminate.

238) *NALQUAT G-8 SERIES — Trio of quaternary ammonium chlorides derived from benzyl chloride and each of three cyclic tert amines (Cf: Nalcamines). Offer exceptional performance at pH below 7. Uses: emulsification, corrosion inhibition, bactericides. Nat'l Aluminate.

239) *NALQUAT G-9 SERIES — Trio of quaternary ammonium chlorides derived from 1,4-dichlorobutane with each of three cyclic tert amines (Cf: Nalcamines). Offer exceptional performance at pH below 7. Uses:

emulsification, corrosion inhibition, bactericides. Nat'l Aluminate.

240) *NEOPENTYL GLYCOL PLASTICIZER — NP-10. Primary plasticizer for PVC. Combines unusual permanence with easy processing. Eastman Chem.

241) NIACIN — Animal feed grade for use as supplement. Ansul.

242) NIACIN — For human, animal, plant nutrition. Koppers.

243) *NICKEL TITANATE — 99+%. Permits high dielectric constants in electronic condensers for TV, radio. Nat'l Lead.

244) NITRIC ACID — Escambia Chem Corp.

245) NITROCELLULOSE LACQUER — Orthoclear High Gloss Finish 615 for top coat in leather finishing. Rohm & Haas.

246) NITROCELLULOSE LACQUER BINDERS, PLASTICIZED — Orthoclear Binders 55-1 and -2 for finishing leather. Rohm & Haas.

247) NONIONIC-ANIONIC TYPE EMULSIFIERS — Emcols H-300X and H-500X are emulsifiers for liquid insecticidal formulations. Free-flowing amber liquids. pH (3% aq soln): 6-7. Emulsol.

248) NONIONIC-ANIONIC TYPE EMULSIFIERS — Emcols H-700 and H-800 are emulsifiers for liquid herbicidal formulations. Free-flowing amber liquids. pH (3% aq soln): 6-7. Emulsol.

249) *NONIONIC FATTY-BASED DERIVATIVE — Emersoft® 7700 is a textile softener. Per year, cost is low. Offers substantial quality advantages. Stable over wide pH range, permits use in all cotton softening uses. Supplied as a 95%-active paste. Emery Ind.

250) NONYL ALCOHOL — BP: 190-200°. In making nonyl plasticizers, such as dinonyl phthalate. Low color. Eastman Chem.

251) NONYLPHENOXY POLYOXYETHYLENE ETHANOL — Igepal CO-210, 100%-active surface-active agent. Nonionic. Emulsion stabilizer, defoamer. Makes plasticizers, detergents, oil additives. Stable at wide pH. Gen'l Aniline.

252) NYLON RESIN — Zytel 42 offers higher impact strength. Is form-stable in molten stage, finished products are tough and stiff. DuPont Polychem.

253) n-OCTYL BROMIDE — 98%. NY Quinine.

254) n-OCTYL CHLORIDE — 98.0% pure. BP: 175-180°. NY Quinine.

255) OCTYL DECYL PHTHALATE — Plasticizer 740 has good low-temp characteristics and permanence in vinyl resin compounds, gives long working life to vinyl plastisols. Reichhold.

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PIN-POINT, by use, the chemical materials you seek. "Use-Index" is on page 44.

MANUFACTURERS' ADDRESSES are on page 94. Contact them for additional details.

REPRINTS of this report are available at $1 a copy, less in quantity.

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256) **n-OCTYL FORMATE** — NY Quinine.

257) **n-OCTYL ISOBUTYRATE** — NY Quinine.

258) **n-OCTYL MERCAPTAN** — 96.2%. BP: 196-200°. NY Quinine.

259) **OCTYLPHENYL ACID PHOSPHATE** — Mixture, MP: 65°. Rust inhibitor, anti-gelling agent. Exc color. V-C Chem.

260) ***OLEYL AMINE** — 88%. Armeen O is a fuel oil additive, corrosion inhibitor, cationic flotation agent, intermediate for quaternaries. Has fluidity, good hydrocarbon sol. Armour.

261) ***ORGANIC DERIVATIVE OF Mg MONTMORILLONITE** — Bentone 38 is an efficient gelling, thickening, and particle suspending agent for organic systems of low and intermediate polarity. Nat'l Lead.

262) ***PALLADIUM ON ALUMINA** — Hydrogenation catalyst has high activity at low cost. Girdler.

263) **PARACHLOROPHENYL & GLYCERYL ETHER** — NY Quinine.

264) ***PASTE FOR COATINGS** — Paste #253 improves processing and characteristics of color coating formulations for machine coated papers. Witco Chem.

265) ***PERMA KLEER-50** — Crystals, CP. Tetrasodium salt of EDTA. High purity, non-hygroscopic crystals. Sequestrant, Refined Products.

266) ***PERMA KLEER-80** — Crystals, CP. Sodium salt of mixed hydroxy alkyl EDTA. Sequestrant. Non-hygroscopic. Refined Products.

267) **PERTHANE** — 75% soln in methyl chloride. Effective against moths, carpet beetles, flies. Use in aerosols and sprays. Very low mammalian toxicity. Rohm & Haas.

268) **PETROLEUM SULFONATE, SYNTHETIC** — Ninate 421 is an emulsifier for cutting oils, corrosion inhibitor. Uniform. Nonol Labs.

269) **PETROLEUM-BASED ASPHALTIC FLUXES** — #20 Softener is plasticizer for natural and GR-S rubbers. Improves processing without seriously changing physicals or rate of cure. Witco Chem.

270) **PETROMIX #9EP** — Soluble cutting oil base has extreme pressure properties. Emulsifies neutral oil. Makes EP soluble cutting and grinding oils. Sonneborn.

271) **PETROMIX #10** — Petroleum sulfonate type soluble oil base. Emulsifier for light hydrocarbon distillates for making emulsion degreasers, agricultural spray emulsions. Sonneborn.

272) **PETROMIX #11** — Petroleum sulfonate oil base is emulsifier for chlorinated solvents in making emulsion degreasers. Sonneborn.

273) **PHENOLIC RESIN** — Fast-bodying, oil-sol resin, #3094 Super-Beckacite, makes durable water- and chemical-resistant varnishes with rapid dry. Reichhold.

274) ***PHENOLIC RESIN, SELF-EXTINGUISHING** — Synco 86 is used for fireproofing cellulosic materials, and in air filters, honeycomb cores, laminates, insulation. Synco.

275) **PHENYL ACID PHOSPHATE** — Mixture, MP: 48°. Mold lube, antistatic agent. Exc color. V-C Chem.

276) **PHENYL TRIMETHYL AMMONIUM HYDROXIDE** — 20-25% soln. NY Quinine.

277) **PHENYL TRIMETHYL AMMONIUM METHOSULFATE** — NY Quinine.

278) **PHTHALALDEHYDIC ACID** — Undergoes reactions analogous to those of an acid anhydride and many of the reactions of an organic acid and aldehyde. Dow.

279) **PHTHALIC ALKYD RESIN** — 60% solids. Duraplex ND-76. Non-oxidizing. For white industrial baking enamels. Rohm & Haas.

280) ***PHTHALOCYANINE DERIVATIVES** — Alcain Blue 8GX 300 gives hues varying from sky turquoise tints to deep saturated tones of rich peacock. Alcian Yellow GX is a shading color in dyeing and printing the above blue. Arnold, Hoffman.

281) ***PHTHALONITRILE** — 97.6% pure. Is a phthalocyanine intermediate with "built-in" nitrogen. Also makes grease gelling agents and pesticides. Makes blue and green dyes. Barrett.

282) **PIGMENTED DISPERSION, WHITE** — Primal White 336 is an aq dispersion for use with acrylic resin binders in finishing leather. Rohm & Haas.

283) **PIPERAZINE** — 98%. An anthelmintic. Makes tranquilizers. Flake form. Jefferson.

284) **PIPERAZINE** — For preparation of anthelmintics, antihistamines, anti-motion sickness drugs, tranquilizers, fibers, plasticizers. Dow.

285) ***PIPERAZINE** — Tech. Eutectic melting at 35° contains approx 40% water. Intermed for resins, rubber chem, dyestuffs, surface-actives, antihelmintics. Carbide & Carbon.

286) ***PLATINUM ON ALUMINA** — Hydrogenation catalyst that offers high activity at low cost. Girdler.

287) ***POLARIS RED** — CP-1285 is a B-O-N pigment with a bright blue shade, improved light resistance compared to other non-bleeding azo reds. For inks, plastics, rubber. Sherwin-Williams.

288) ***POLYALKYLENE GLYCOL-ETHER** — Tergitol Nonionic XH is a low-foaming detergent, emulsifier. Designed for use at high temp and in emulsions of active-solvent systems. Carbide & Carbon.

289) **POLYAMIDE RESIN** — Versamid 125 is a non-toxic, low viscosity curing agent for epoxy resins. For use in adhesives, castings, laminates, protective coatings when reacted with epoxy resins. Gen'l Mills Chem Div.

290) **POLYBUTENES** — Polyvis are oily liquids whose viscosity and tackiness increase as their mw. Linear polymers, mw varies from 660 to 1520. They offer many advantages when used in calking and sealing compounds, adhesives, protective coatings, rubber, electrical components. leather, plastics, insecticides, moisture-proofers. Cosden.

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Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
Temperatures are in °C
Solubilities are at room temperature

When inquiring check 2652 opposite last page

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291) **POLYBUTYLENE GLYCOLS** — Available mw's: 500, 1000, 1500, 2000. Suggested uses: as oil additive, polyurethane foam intermediate. Dow.

292) **POLYEPICHLOROHYDRIN** — Intermediate for non-flammable products. Available mw's: 450, 900, 1150. Dow.

293) ***POLYESTER** — Fomrez 50 produces reproducible uniform flexible urethane foams which are fine-celled, low density, low compression set, high stability when exposed to accelerated humidity aging. Witco Chem.

294) ***POLYESTER DYES** — Series of 9 dyes have exc all-around color fastness, broad range of color. For polyester fibers. Eastman Chem.

295) **POLYESTER RESIN** — For flexible urethane foams of low density, medium firmness, exc. ageing properties. Polylite 8651. Reichhold.

296) **POLYESTER RESIN** — For rigid urethane foams of good strength/density ratios, good dimensional stability, low heat transmission properties. Polylite 8601. Reichhold.

297) **POLYESTER RESIN** — Polylite 8100 is highly light stable for making quality translucent and opaque paneling. Is strong, durable, heat resistant, light and color stable. Reichhold.

298) **POLYESTER RESIN** — Polylite 8166 for molding, casting, gel coats. Has good wetting properties, high impact and shock resistance, good strength and rigidity. Reichhold.

299) **POLYESTER RESIN, FLEXIBLE** — Polylite 8120 blends with rigid-type polyesters to up resiliency, impact resistance. Low styrene content. Reichhold.

300) **POLYESTER RESIN, MODIFIED** — Polylite 8400 resin has been modified with diallyl phthalate for general purpose use as high viscosity, rigid-type resin for curing at elevated temp. Has exc. catalyzed stability at room temp, is non-volatile. Reichhold.

301) **POLYESTER RESIN, RESILIENT** — Polylite 8181 is vinyl toluene-modified, is designed for pre-mix compounding, matched die molding. Has low volatility of monomer, high impact strength and hot strength, fast curing properties. Reichhold.

302) **POLYESTER RESIN, RIGID** — Polylite 8050 is an impregnant, binder and sealant, adaptable to matched die, pre-mix, lay-up molding. Has good electrical properties, chemical and heat resistance. Reichhold.

303) **POLYESTER RESIN, STYRENE MODIFIED** — Polylite 8180 for pre-mix compounding, matched die molding. Has exceptional impact strength, resiliency and hot strength, cures rapidly. Reichhold.

304) ***POLYETHYLENE, EMULSIFIED** — Moropol 700 is 30%-active, non-toxic. Nitrogen-free, acid and electrolyte stable, nonionic emulsion for use as a textile softener and plasticizer for resin-treated fabrics. Moretex.

305) **POLYETHYLENE RESIN** — DXM-103 for unbreakable molded articles. Dense, improved tensile strength, surface hardness, resists staining. Bakelite.

306) **POLYETHYLENE RESINS, INTERMEDIATE** — Alathon 34, 34A, and 37 have a density intermediate

(*Please turn to page 67*)

Company announces line of nonionic agents

Group of four surface-active nonionic agents which are chemically stable, and compatible with acids, alkalies, and other detergents, particularly cationic type, are being added to company's line of chemicals. Agents, all alkyl phenol polyglycol ethers, are liquids made from petroleum-base materials.

Poly-Tergent B-200 is useful in solvent systems as detergent and dispersant, and where reduction of interfacial tensions will aid in wetting and spreading. As an emulsifier, it may be used alone or in combination with more hydrophilic types.

Poly-Tergent B-300 possesses properties as wetting agent, detergent, emulsifier and dispersant. It is completely soluble in water up to temperatures of 52-56°C, and in some organic solvents.

Poly-Tergent G-200 is intended primarily to serve as emulsifying agent and associate emulsifier. It is useful in many solvent systems to increase detergency, dispersibility, and wetting action.

Poly-Tergent G-300 is completely soluble in water up to 62-70°C, and in various organics. Highly stable chemically, it is a good wetting agent, detergent, and dispersant over wide range of conditions. It gives good emulsions with aromatic solvents, chlorinated paraffins, and vegetable oils. It also has applications for wetting and suspending such materials as clay, pigments, carbon black, and red iron oxide.

(Poly-Tergents B-200, B-300, G-200, and G-300 are available from Industrial Chemicals Div., Olin Mathieson Chemical Corp., Dept. CP, 460 Park Ave., New York 22, N.Y. . . . or for more information check 2652A on form opposite last page.)

For more information on product at right, specify 2653 . . . see information request blank opposite last page.

CHEMICAL MATERIALS

Vulcanizing agent provides controlled reactivity

Uses: Developed as vulcanizing agent for fluorocarbon or other reactive-halogen or acrylic-ester type rubbers.

Features: More uniform distribution of cross-links between elastomer molecules is achieved by the agent through controlled reactivity. Normally active amine groups are shielded until curative and polymer are thoroughly mixed.

Description: Vulcanizing agent is an inner salt of W-amino hexyl carbamic acid. It is a free-flowing white powder which is soluble in water but insoluble in non-polar solvents. Compounds containing three parts of vulcanizing agent per hundred of fluorocarbon rubber, along with metal oxides as modifiers, have been cured at 300-350°F.

Vulcanizates having good physical properties, thermal stability, and resistance to mineral acids, oils, and fuels at elevated temperatures were produced.

(HMDA-Carbamate is available from Chemical Mfg. Div., M. W. Kellogg Co., Dept. CP, Jersey City 3, N.J. Check 2655 opposite last page.)

Skin penetration speeded with purified oil

Uses: As a vehicle for topical pharmaceuticals and cosmetics.

Features: Specially prepared oil has property of accelerating rate, depth, and extent of percutaneous penetration of medicinal agent through skin when added to an inunction.

Description: Product is odorless, tasteless, colorless, and completely stable. It is a biogenic constituent of human skin oil, and is non-toxic and non-allergenic.

(Robane is product of Robeco Chemicals, Inc., Dept. CP, 25 E. 26th St., New York 10, N. Y. . . . or for information check 2656 opposite last page.)

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between conventional and linear polyethylenes (sp gr: 0.93). 34 and 34A have low melt indexes, 37 is moderately high. 34A has an additive to improve frictional properties of film. Uses: film, bottles, wire coating, paper and injection molding. DuPont Polychem.

307) **POLYGLYCOL** — E20,000. Uses: foam rubber mold release agent, water-sol binder for textile and paper starch sizes, suspending agent, ironing aid in laundry starch. Dow.

308) **POLYGLYCOL OLEATE** — Refined grade. Witco 31 is a gen'l purpose nonionic emulsifier for fats, oils, some waxes. Witco Chem.

309) **POLYISOCYANATE RESIN & CATALYST** — Nafil Resin and Catalyst makes rigid and flexible polyurethane foam. When mixed, components set and cure with no external heat or pressure. Chase.

310) ***POLYMERIC PLASTICIZER** — Admex 760 for vinyl film, sheeting, extrusions. Offers permanence and non-migration. A-D-M.

311) ***POLYMERIC PLASTICIZER** — Admex 761 for vinyl film, sheeting, extrusion. Offers low viscosity and resists extraction. A-D-M.

312) **POLYMERIC THERMOSETTING RESIN, ANIONIC** — Rhonite 467 is a hand builder for textile finishing. Rohm & Haas.

313) **POLYOXYALKYLENE ETHANOL** — Emulphogene BC-420 surface-active agent to be sulfated for detergent formulations. Oil soluble. Gen'l Aniline.

314) ***POLYOXYALKYLENE GLYCOL** — 100%. Pluronic. Di-functional resins for polyurethane manufacture. Very stable, wide mw range, low cost, low toxicity. Wyandotte.

315) ***POLYOXYALKYLENE GLYCOL DERIVATIVE OF ETHYLENE DIAMINE** — 100%. Tetronic. Tetra-functional resins for polyurethane manufacture. Very stable, wide mw range, low cost, low toxicity. Wyandotte.

316) ***POLYOXYETHYLENE ETHER OF AN ALKYLATED ALCOHOL** — Nopco 1525-L is a nonionic emulsifier for solvents, resins, PVA polymerization. Nopco.

317) **POLYSTYRENE GLYCOLS** — Available mw's: 500, 750. Uses: intermediate for surface-actives incorporating hydrophobic phenyl group. Dow.

318) ***POLYSTYRENE EMULSION, MODIFIED** — Ubatol U-2003 has fine particle size, water and abrasion resistance. Is a component for floor waxes or polishes or both. U B S Chem.

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PIN-POINT, by use, the chemical materials you seek. "Use-Index" is on page 44.

MANUFACTURERS' ADDRESSES are on page 94. Contact them for additional details.

REPRINTS of this report are available at $1 a copy, less in quantity.

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319) POLYVINYL ACETATE COPOLYMER EMULSION — Resyn 25-1255 is internally plasticized emulsion. Pigment binder for emulsion paints. High binding capacity, water resistance. Nat'l Starch.

320) POLYVINYL ACETATE EMULSION — All-purpose for adhesive, textile, paper industries. Plyamul 9350 comes in two grades: 900-1200 cp, 1500-1900 cp at 55% nv. Reichhold.

321) *POLYVINYL ACETATE EMULSION — Elvacet 84-1100 is a vehicle for exterior masonry, interior and primer-sealer paints, adhesives, textile finishes, paper coatings and binders. Has exc water resistance and compounding characteristics. DuPont.

322) POLYVINYL ACETATE EMULSION — Resyn 25-1014 homopolymer emulsion. Textile finish, pigment binder for coatings. Discoloration resistance @ 300°F. High binding power, clear glossy dry film. Nat'l Starch.

323) POLYVINYL ACETATE EMULSION — Vinac WR 50, vehicle or binder in paints, textile sizes, adhesives. Water resistance, uniform distribution of particles. Colton.

324) *POLYVINYL ACETATE TRIPOLYMER EMULSION — Resyn 25-1234 is internally plasticized emulsion. Binder for non-woven cloth. Pigment binder for paper coatings. High film flexibility, excellent aging. Nat'l Starch.

325) *POTASSIUM IODATE — Primary std. AR. Assays 99.95-100.05% KIO_3. Mallinckrodt.

326) POTASSIUM SILICO FLUORIDE — 98.5% For enameling, rubber industries. Coronet Phosphate.

327) PRESERVATIVE FOR CELLULOSICS — NCG Process® for preserving cellulosic materials such as wood, cotton fibers, rayon, linen, jute. Cu formate is used, but only the copper is retained as a permanent Cu-cellulose complex is formed. Non-toxic. Wood won't bloom or bleed and can be painted. Odorless. Nat'l Cyl Gas.

328) 1-(2-PYRIDYLAZO)-2-NAPHTHOL — PAN reagent. Has color sensitivity control. A complexing indicator for detection of heavy metals in presence of alkaline earths. J. T. Baker.

329) PYROCATECHOL SULFONPHTHALEIN — Pyrocatechol Violet, reagent indicator for metal ion detection. J. T. Baker.

330) *QUATERNARY AMMONIUM FATTY DERIVATIVE — Ahcovel X57 is water-sol, cationic, easily dispersible paste. Shows superior softening properties on cotton, rayon, nylon, Orlon, Dacron. Compatible with most resin catalysts, Low Cl retention, low foaming. Arnold, Hoffman.

331) QUININIC ACID — NY Quinine.

332) *RESIN SOLUTION — Arcco Release Coatings. Versatile coatings are designed to properly release adhesives on paper tapes. Have exc release properties. C-600 is applied by roll coater, knife, gravure roll. C-601 (2 part) for use where oil and grease resistance is a factor. Borden Chem Div.

333) RUBBER-RESIN ADHESIVES — Solvent-based. Pliotac is contact adhesive for bonding large areas of unlike materials. Has "open time" up to one hr. Pliobond HT is for high-temp application up to 400°F of metal-to-metal or metal-to-plastic. Goodyear Chem Div.

334) *RUBEANIC ACID — AR. Complexing agent for metallic salts. Forms colored, insol rubeanates. Mallinckrodt.

335) SEBACIC ACID — For specialty plasticizers, jet lubes, polyesters, specialty alkyd resins. CP grade has MP: 130.5-132°. Regular grade has MP: 129-130.5°. Reichhold.

336) SETAMOL DA — Liquid, prevents dyestuff staining in textile processing. Gen'l Aniline.

337) SILICONE EMULSION — SM-62 is excellent release agent for rubber, metal, plastics, glass. Is lube for glass fibers. Has improved dilution and heat stability. GE Silicone.

338) *SILICONE EMULSION — Syl-Softs 10 and 12 are softeners and lubricants used in fabric finishing. Effective at low conc, impart softer hand, improve tear strength. Dow Corning.

339) *SILICONE ORGANIC RESIN — Resin vehicle for making heat resistant finishes. Gives fast bake, hardness, arc resistance, gloss retention, heat and weather resistance. SR-120 Resin. GE Silicone.

340) SILICONE RUBBER COMPOUND — SE-701U compound is for soln coating glass fabric that's to be used as hot air ducting. Flexes to −120°F, carries air up to 700°F. GE Silicone.

341) SILICONE RUBBER COMPOUNDS — For high-temp molded, extruded, calendered parts with compression set resistance. No toxic additives. SE-351 has 50 duro; 361 has 60 duro; 371 has 70 duro; and 381 has 80 duro. GE Silicone.

342) SILICONE RUBBER GUMS — Makes silicone rubbers with low compression set, no toxic additives. Allow close control of vulcanization, short oven cures. SE-31 Gum. SE-33 Gum is similar, but its low shrinkage permits closer tolerance on finished parts. GE Silicone.

343) *SIMAZIN — 2-Chloro-4,6-bis-(ethylamino)-S-triazine is an herbicide, highly selective against corn. LD_{50}: 5 gm/kg to mice. MP: 104°. Geigy.

344) *β-SITOSTEROL — MP: 134-140°, non-toxic. Purity: 95%. Pharmaceutical uses. Swift.

345) SITOSTEROLS — Pure sitosterols are pharmaceutical intermediates. Gen'l Mills Chem Div.

346) SODIUM BARBITURATE — 95+%. Reactive salt of barbituric acid. Chem intermed. Abbott.

347) SODIUM BISULFATE — Tech. Ingredient in acid-type industrial cleaners. Ansul.

348) SODIUM CHLORIDE — 99.95%. Ca and Mg free. No complex side reactions due to impurities. For textile dyeing, pharmaceuticals, dye making. Diamond Crystal Salt.

349) SODIUM DI-OCTYLSULFONSUCCINATE — Monawet MO-70% liquid, tech. Emulsifier, wetting agent for textiles, agriculture. Very fast wetter. Mona.

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Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
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(*Continued from preceding page*)

350) *SODIUM FORMATE — Reagent, insolubles only 0.005%. Precipitation of "noble" metals. Aid in dyeing and printing of fabrics. Fisher Sci.

351) SODIUM HYDROSULFITE — 94%. A dry, white, free-flowing, dust-free powder. Uses: vat color reduction of textiles; bleaching of soaps, sugars, paper pulp, oils, minerals, fibers; reducing agent. Tenn Corp.

352) SODIUM ISOASCORBATE — Non-toxic antioxidant for meats, beverages. No vitamin activity. Pfizer.

353) SODIUM ISOASCORBATE — Purity 98%, approved as antioxidant, reducing agent for foods, industrial products. Merck.

354) *SODIUM LAURYL ETHER SULFATE — Sipon ES for cosmetics, household and industrial detergents. High foam, hard-water resistance, compatibility and solubilizing action with electrolytes. Am Alcolac.

355) SODIUM LAURYL SULFATE — 99.5%. Texapon L 100. Cosmetic uses. Fallek.

356) *SODIUM LAURYL SULFATE NEEDLES — 89-94%. USP. Needle form is easier to handle, has no dust. For making toothpaste, wetting and dispersing agent in printing inks. Aceto Chem.

357) SODIUM SALT OF NEUTRAL PETROLEUM SULFONIC ACID — Petrosul 645 finds use as an emulsifier. Penn Refining.

358) SODIUM SALT OF SYNTHETIC ALKYLARYL SULFONIC ACID — Alkosul 645 is rust preventive, fuel oil additive, fat splitting agent, dry cleaning detergent. Penn Refining.

359) *SODIUM SILICATE, MODIFIED — Moroc Sand Binder is designed for use in silicate-CO_2 process for production of cores and molds. Binder doesn't separate on storage, has good flowability, rapid gas reaction, gives high-strength cores and molds with excellent dimensional accuracy. Diamond Alkali.

360) *SODIUM SILICO ALUMINATES — Zeolex pigments are extenders for printing inks, flatting agents for varnishes and lacquers. Have low cost, stability to light and shelf aging. Huber.

361) SODIUM ZIRCONIUM SILICATE — Tanning matl for true white leather. Rohm & Haas.

362) SOLANTINE BLUE GREEN BFL — A nondusting, light-fast direct dye producing bright bluish-green shades on cotton and rayon. Allied Chem Nat'l An Div.

363) SOLANTINE BROWN 4RLVF — A nondusting direct dye producing moderately bright shades of red-brown on cotton and rayon. Has high tinctorial value. Apply at low temp. Allied Chem Nat'l An Div.

364) SOLANTINE ORANGE EGL — A nondusting direct dye of excellent solubility. Gives moderately bright shades of yellow-orange on cotton and rayon. Unaffected by metals in dyebath. Allied Chem Nat'l An Div.

365) *SOLFAST RED — CP-1296 has great strength and clean shade. For printing inks, plastics, rubber, paints. Sherwin-Williams.

366) *SOLVENT-TYPE ADHESIVE — Arcco heat-seal adhesives for blister or skin packaging. Quick sealing. Strong Bond. Borden Chem Div.

367) *SOLVENT-TYPE ADHESIVE — Arcco 1275

10 F is a general purpose vinyl adhesive for bonding vinyl, rubber, wood, paper, or metal to the same or other of these surfaces. Fast drying, high initial strength, strong bond, flexible. Borden Chem Div.

368) **SOYA OIL** — Hi-dry soya oil is an excellent drying soya product for pale color retention protective coatings. Cargill.

369) ***STARCH, CATIONIC** — Cato 8 increases retention of pigments in paper. Warp size. Sizing for glass yarn. Flocculating agent. High affinity for negatively charged surfaces. Nat'l Starch.

370) **STEAROXYACETIC ACID** — $C_{17}H_{35}COOCH_2$-COOH. MP: 57-59°. NY Quinine.

371) **STEARYL ACID PHOSPHATE** — Mixture, MP: 67°. Release agent for masking tape; rust inhibitor, mold lube for plastics. Excellent color. V-C Chem.

372) **STIGMASTEROL-SITOSTEROLS, MIXED** — For pharmaceuticals. Gen'l Mills Chem Div.

373) ***STRONGLY BASIC ANION EXCHANGE BEADS** — Permutit SK for ion exchange columns for uranium recovery. High capacity resin with unequalled high speed of uranium elution from resin when using nitrate eluting soln. Permutit.

374) ***STRONGLY BASIC ANION EXCHANGE BEADS** — Permutit SKB for resin-in-pulp recovery of uranium. Resin has high capacity, high speed of elution. Permutit.

375) ***STYRENE** — High-impact molding cmpd. Heat distortion point 190 to 195°F. Bakelite.

376) ***STYRENE COPOLYMER, MODIFIED** — Piccoflex is 100% pure. MP: 100-105°. Use: vehicle formulations in coatings, pot compounds. Can be used in varnishes and lacquers, metal coatings, vinyl coatings, lithographic coatings, and traffic paints. Copolymer has excellent resistance to water, acids, alkalis, salt, and aliphatic hydrocarbons. Has excellent pigment wetting, color retention, adhesion properties, and flexibility. Penna Ind Chem.

377) **STYRENE RESIN, MODIFIED** — Plio-Tuf P-100 is high impact strength, stiff resin for injection molding. Goodyear Chem Div.

378) **STYRENE/ACRYLONITRILE THERMOPLASTIC** — Styrex 767 is tough, chemical and solvent resistant, high degree of clarity, excellent resistance to heat and low-temp. For dinner ware, refrigerator parts, aerosol nozzles, dentures. Dow.

379) ***SULFATED ETHOXYLATED FATTY ALCOHOL, Na SALT** — Solaset maintains original viscosity on dilution with water with addition of small amounts of salt. Makes shampoos, liquid detergents, liquid foaming agents. Aceto Chem.

(*Please turn to next page*)

PIN-POINT, by use, the chemical materials you seek. "Use-Index" is on page 44.

MANUFACTURERS' ADDRESSES are on page 94. Contact them for additional details.

REPRINTS of this report are available at $1 a copy, less in quantity.

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(*Continued from preceding page*)

380) **SULFONATE-NONIONIC BLENDS** — Toximul Emulsifiers for insecticides. Feature spontaneity of emulsification. Ninol Labs.

381) ***SULFONATED POLYSTYRENE CATION EXCHANGE BEADS** — Catalyst Grade Permutit Q-H are the hydrogen form of these beads. Improved quality, high hydrogen content, low impurities make it more suitable as an acid catalyst for epoxidation of unsaturated oils, ethylene oxide hydration, ester alcoholysis. Also for continuous processing, reduces equipment and maintenance costs. Permutit.

382) **SURFACE-ACTIVE AGENT** — 912 Emulsifier is non-foaming, enables rapid incorporation of methyl cellulose into latex systems. Witco Chem.

384) **SURFACE-ACTIVES, HYDROPHILIC** — OPE-16, -20 and -30 are 70% aq solns. Rohm & Haas.

385) **SURFACE-ACTIVE, NONIONIC** — Lavepon. For raw wool scouring in neutral or alkaline systems. Rohm & Haas.

386) ***SURFYNOL TG** — 83%-active. Mixture of ditertiary acetylenic glycol, alkyl phenyl ether of polyethylene glycol and ethylene glycol. MP: $< -40°$. For pigment dispersion in aq systems. In paints, promotes increased hiding power and greater color development. Air Reduction.

387) ***SURFYNOL 104E** — 50% soln (wt) of ditertiary acetylenic glycol (Surfynol 104) in ethylene glycol. Reduces foam in combination with other surface-actives. Air Reduction.

388) **TALLOW FATTY ALCOHOL SULFATE** – Maprofix TAS. Exc detergent and foamer at high temp. Onyx Oil.

389) **TANNING AGENT** — Leukanol C is based on formaldehyde condensed phenolsulfonic acid. Improves light stability of white and pastel leathers. Rohm & Haas.

390) **TEFLON RESIN** — Teflon 6 is designed for processing in a modified extrusion technique involving use of organic extrusion aids. Can be used at 500°F service temp. DuPont Polychem.

391) **N,N,N',N'-TETRAKIS (2-HYDROXYPROPYL) ETHYLENE DIAMINE** — 100%. Quadrol. Tetra-functional for rigid polyurethane foams of low density. Wyandotte.

392) **THERMOSETTING RESIN CATALYST** — H-7 improves degree of cure and ups physicals. Exc bath stability, compatibility. Rohm & Haas.

393) **THERMOPLASTIC RESIN DISPERSION** – Nonionic. Rhoplex WN-77 helps develop durable, full, firm hand in fabric finishing. Rohm & Haas.

394) ***THIXOTROPIC ADDITIVE** — Jel-O-Mer 903, to produce thixotropic paints. Alkydol Labs.

395) ***THYMOL** — USP. Terpene-derived for pharmaceuticals, chemicals. Newport Ind.

396) **TRANSISTOR CHEMICALS** — TransistARs for transistors and other semi-conductor devices. Contain <1 ppm heavy metals. Over two dozen organics and acids are available. Mallinckrodt.

397) **TRI BUTYL PHOSPHATE** — 99%. Celluphos-4 is an effective antifoam for latex emulsion systems, a U ore extraction solvent, plasticizer. BP (4 mm): 138°. Mod toxic. Celanese.

398) **TRI NORMAL PROPYL PHOSPHATE** — 99%. Celluphos-3 is a dying assistant with tri acetate. Permits level dying of deep shades. BP: 230°. Mod toxic. Celanese.

399) **TRICHLOROMONOFLUOROMETHANE** — Isotron 11 can be used as a refrigerant and propellant. PennSalt.

400) **TRIMETHYLOLPROPANE** — 98.5%. Low water content. Free-flowing flakes. For poly-urethanes, alkyd resins, surface-actives, plasticizers, synthetic lubes. Celanese.

401) ***TRIS(HYDROXYMETHYL)AMINOMETHANE** — BP: 219-220°. Acidimetric std., crude oil demulsifier, making alkyd resin. Comm Solv.

402) ***TRIS(HYDROXYMETHYL)AMINOMETHANE** — Reagent. Commercially available direct acid standard. Is also a buffer in biochem research. Fisher Sci.

403) ***TRIS(HYDROXYMETHYL)NITROMETHANE** — For anti-fungal and anti-bacterial applications in cutting oils, paper making. Comm Solv.

404) **TRISODIUM HYDROXYETHYL ETHYLENEDIAMINE TRIACETATE** — Cheelox HE-24, chelating agent for Ca, Mg, Fe ions. Sol. and stable in neutral, acid, alkaline soln. Gen'l Aniline.

405) ***URANIUM DIOXIDE** — Ceramic gr for sintering and pressing into ceramic bodies, also a nuclear reactor fuel. Can be supplied in varying enrichments. Mallinckrodt.

406) ***URANIUM OXIDE** — UO_2 High fired. Prep. of "Matrix type" reactor fuel elements. Comes in varying enrichments. Mallinckrodt.

407) ***URANIUM OXIDE** — UO_3. For lab amounts of many uranyl salts. Makes nuclear reactor matls. Supplied in varying degree of enrichment. Mallinckrodt.

408) ***URANIUM OXIDE** — U_3O_8. Special ceramic additive. Makes nuclear reactor fuels. Comes in varying enrichments. Mallinckrodt.

409) ***URANYL SULFATE** — A reactor fuel soln in small "water boiler" research. Can be supplied in varying degrees of enrichment from normal isotopic content to highly enriched. Mallinckrodt.

410) **URETHANE** — USP. MP: 48°. Used in pharmaceuticals, as co-solvent, in syntheses. Has high level biological activity. Organic Chem Div FMC.

411) ***URIDINE 2':3'-CYCLIC PHOSPHATE, Ba** — Biochemical research. Schwarz Labs.

412) ***VINYL ACETATE** — Darex 16261F homopolymer emulsion. Water-base paint vehicle, adhesive base, textile size. Particle size: < 0.2 microns. Non-toxic. Dewey & Almy.

(*Please turn to next page*)

Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
Temperatures are in °C
Solubilities are at room temperature

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(*Continued from preceding page*)

413) *VINYL ACETATE — Everflex 2897G and 2898G copolymer emulsions. Water-base paint vehicles, adhesive bases, textile sizes. Particle size: < 0.1 micron. Internally plasticized. Dewey & Almy.

414) VINYL BUTYRATE — BP: 116.7°. Prep of resins for use as surface coatings, textile sizes, adhesives. Carbide & Carbon.

415) VINYL CHLORIDE COPOLYMER, HIGH MW — Exon 481 for soln coatings of high tensile strength, applied by common lacquer techniques. Firestone.

416) VINYL CHLORIDE COPOLYMER, MEDIUM MW — Exon 485 for soln coatings. Will not adhere to metals. Sol in ketones and tolerates large portions of aromatic diluents. Firestone.

417) VINYL 2-ETHYLHEXOATE — BP: 185.2°. Prep of resins for use as surface coatings, textile sizes, adhesives. Carbide & Carbon.

418) 2-VINYL-5-ETHYLPYRIDINE — 95+%. Water content: 0.5% max. Ref ind (n_D 20°): 1.5374 min. Mw: 133.19. Reilly Tar.

419) VINYL PROPIONATE — BP: 94.9°. Prep of resins for surface coatings, textile sizes, adhesives. Carbide & Carbon.

420) *VINYL SHEET — Rigid, calendered sheet can be used in contact with meats, poultry, sea food. Dimensionally stable, low water absorption. Bakelite.

421) *VINYLTOLUENE/DRYING OIL COPOLYMER — Copolymer XP-1059 is 40% solids in odorless mineral spirits. A vehicle for flat wall paint, it has controlled thixotropy, non-penetration, low odor, and can be handled in bulk. Spencer Kellogg.

422) *VINYLTOLUENE/VEGETABLE OIL COPOLYMERS — 60% Solids. Keltrol 1001 is in mineral spirits, 1013 is in xylol, and 1074 (still under development) is in VM&P naphtha. They have extremely fast dry and excellent film hardness, good gloss, good alkali and water resistance. Uses: enamels, paints, sealers, overprint varnishes. Spencer Kellogg.

423) VITAMIN D_3 — 99.9% cryst and in oil soln Low cost. Aldrich Chem.

424)—WATER REPELLENT — Morepel RW for cotton, synthetic fabrics. Very small particle size, won't effect color fastness. Moretex.

425) WAX, SYNTHETIC — 225 Wax has approx MP of 225°F. Modifies low-MP compounds, increases softening point of asphalt pipe-wrap, and provides special polar lubrication. Resists practically all solvents, acids, and alkalis, and has good dielectric properties. It is a fatty amide wax. Carlisle.

426) XANTHINE-8-C^{14} — "Tagged" on C-8 for biochemical research. Schwarz Labs.

427) *XANTHYLIC ACID-8-C^{14} — Mixed isomers for biochemical research. Schwarz Labs.

428) *XANTHOSINE-8-C^{14} — Biochemical research. Schwarz Labs.

429) *2,4-XYLIDINE — 96.5+%. Intermediate for pigments and lakes. Aceto Chem.

430) *YELLOW, RED, AND BLUE DYES — Procion Yellow R, Brilliant Red 2B, and Blue 3G give fast, brilliant shades on cellulose fabrics, nylon, and wool. Mu-

tually compatible, high aq solubility. Arnold, Hoffman.

431) *ZINC ORGANIC COMPLEX — Nalzin is a co-stabilizer with Ba-Cd stabilizers that eliminates discoloration due to sulfide exposures in vinyl chloride plastics. Used as recommended, won't affect heat stability, clarity of primary stabilizer. Nat'l Lead.

432) *ZIRCONIUM OXYCHLORIDE — 99+% pure. Permits suitable pH control in personal deodorants. Also used in lakes and toners. Nat'l Lead.

TOO LATE TO CLASSIFY

Aerogon Chemical Industries, Inc., 240 Broadway, New York 7, N.Y., offers:

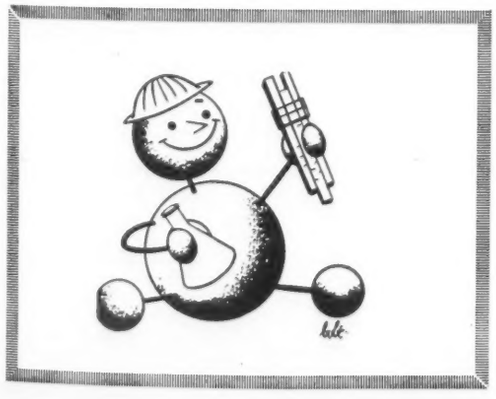
*OXIDIZED FISCHER-TROPSCH HYDROCARBON POLYMERS — Aerok E Series polymer waxes come with varying hardnesses and acid values. Are high melting, light colored, emulsifiable. For polishes, carbon paper, sizings, lubricants, finishes. Commercial.

*REACTION PRODUCTS OF FISCHER-TROPSCH HYDROCARBONS — Aerok 250 offers toughness, solvent retention, light color. For solvent-system polishes, carbon paper. Commercial. Aerok C-33 has dye-solubilizing, pigment dispersion properties. For carbon paper, inks. Developmental. Aerok PS has salve-like smoothness in solvents and oils. For solvent polishes, carbon paper. Commercial.

*OXIDIZED MICROCRYSTALLINE POLYMERS — Microgon Series emulsifiable waxes have exc color, toughness, low cost. For polishes, carbon paper, sizings. Commercial.

*SOLID ALIPHATIC HYDROCARBON POLYMERS — Aerzok Wax is white, tough. Replacement for ozokerite wax in paper coatings, food wrappings, polishes. Commercial.

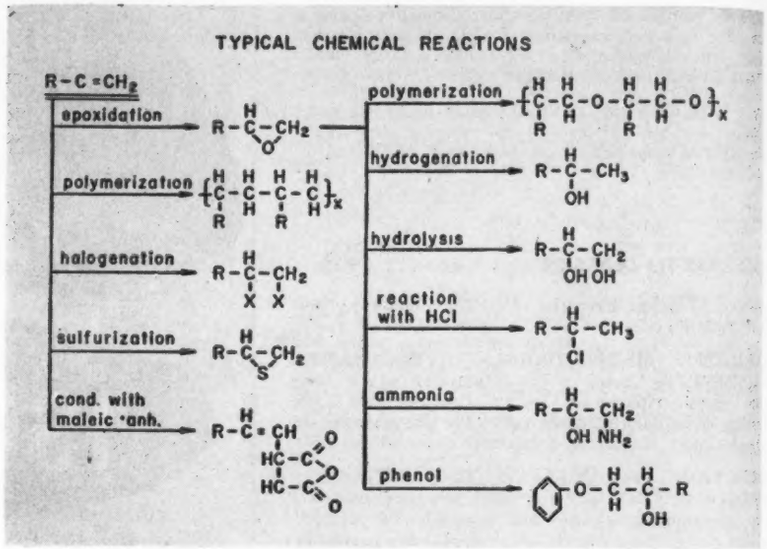
Please turn to page 79 for start of listing of Developmental-scale materials of 1956



- High purity
- High molecular weights
- Controlled unsaturation

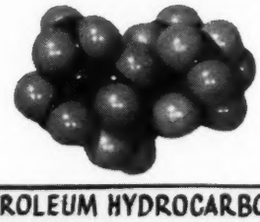
point to a bright future for . . .

STRAIGHT-CHAIN ALPHA OLEFINS



HYDROCARBON (C_{12})

α OLEFIN (C_{12})



PETROLEUM HYDROCARBON (C_{12})

Straight-chain C_{12} to C_{22} olefins — with the unsaturation between the 1 and 2 carbon atoms — are new tools to builders of chemical products. Here's why:

High purity — Because these products are made by dehydration of purified fatty alcohols of known composition and chain length, in turn derived from tallow, marine, or vegetable oils, alpha olefins have final purities greater than 90%.

High molecular weight — Normal straight-chain alpha olefins of equal uniformity are not possible from petroleum sources at present, and fats are the only source of raw material.

Straight chain — A major difference between alpha olefins and those derived from petroleum is in their configuration. The alpha olefins and hydrocarbons derived from animal or vegetable oils are straight chain (normal), while the higher-mw petroleum olefins contain also branched-chain or cyclic. This is illustrated by the three atom models above.

An advantage of the straight-chain compounds is that they appear to have better metal-wetting properties — just as a straight, long, slender material adheres to a surface better than something with legs or something round, like a ball. This has not yet been proved, but there is strong indication that this is so.

Straight-chain olefins, once reacted or hydrogenated, are more stable against oxidation than the branched chain. They are also more resistant to chemical attack, and resist break-down under shear or moderately high temperatures. In a branched-chain compound, sometimes a side-chain breaks off, vaporizing and leaving an unwanted double bond which can polymerize.

Controlled unsaturation — This means that the position of the double bond of the long-chain olefins is controlled. It can be either between the 1 and 2 carbons (an alpha olefin) or at or near the middle of the chain. The double bond may be randomly distributed at various positions.

typical properties of high purity

Chain length	Mol. wt.	Product number	Mols α-olefin per liter
C_{12}	169-172	4487A	4.32
C_{14}	196-207	4690A	3.95
C_{16}	226-231	727	3.45
C_{18}	247-263	664	3.05
mixed straight-chain alpha olefiins			
C_{6}-C_{18}	180-191	4635	3.94
C_{10}-C_{18}	232-240	4697A	3.36
C_{12}-C_{20}	230 (avg)	3877A	3.2 min
C_{18}-C_{22}	280-309	4156A	2.73
mixed straight-chain isomerized olefins			
C_{14}-C_{18}	232-240	4154-511	—
C_{18}-C_{22}	280-309	4044A	—
saturated straight-chain compounds			
C_{12}	172-174	L298-9	—
C_{16}	234-242	L296-9	—
C_{14}-C_{20}	232 (avg)	195-56	—
C_{18}-C_{22}	282-310	162-56	—

High purity alpha olefins of single chain length are emerging from pilot-scale to commercial production, and tankcar shipments are being made. Mixed chain length alpha olefins and iso olefins (with the double bond at a designated position in the chain), and the corresponding saturated olefins (n-alkanes), are in commercial production.

Potential

The imagination of research and development men in all phases of our industry should be stimulated by the potential of these products. They are highly reactive. The field is wide open to utilize them as both chemical intermediates or as reactants to modify existing products.

One of the largest potential uses is visualized in lubricating oil additives — viscosity index improvers, pour-point depressants, detergents, rust inhibitors, and lead scavengers. Leather treating, textile, and paper chemicals, adhesives, plastics, synthetic rubber, polymers, resins, surface-active agents, and protective coatings stand to benefit from these olefins.

The hydrogenated straight chain olefins may be of particular interest in lubricants for use in nuclear power plants. It appears that the animal and vegetable oil-based hydrocarbons withstand the effects of radiation better than lubricants based on petroleum. Military applications may also be of importance.

Because of their higher cost, along with their special properties, these fat-derived olefins are not thought of as replacements for present hydro-

(*Please turn to next page*)

straight-chain alpha olefins

Iodine value	Bromine number	Cloud pt. (°F)	Viscosity (cps @ 25°C)
139.9	90	24	—
128.6	81	—	—
107.8	68	42	—
101.5	64	52	—
130.0	82.2	—	—
110.3	69.0	40	—
100-115	65-70	35-50	—
88	55	83	—
110-115	68-72	0	—
90-96	56-60	32	—
0.19	nil	8	1.67
0.20	nil	52	2.96
0.58	nil	71	5.40
0.70	nil	MP: 36.6	—

Alpha Olefins

(Continued from preceding page)

carbons derived from petroleum. It is anticipated that the olefins will substitute only in specialized applications and that they will find applications that heretofore have not been feasible.

Details

Alpha olefins of C_{12} to C_{22} length have freezing points from 35°C to 42°C, respectively. Isomerization of the normal olefin or shifting the double bond will vary the freezing point beyond what has been reported for the alpha olefin. Olefins range from oily water-white liquids to waxy solids at room temp. Boiling points (760 mm) go from 213°C for C_{12} alpha olefin to 368°C for C_{22}. All have excellent solubility characteristics.

The n-alkanes (hydrogenated olefins) are much like their unsaturated counterparts. Their melting or cloud points, however, are somewhat higher.

(Alpha olefins are products of Chemical Div., Archer-Daniels-Midland Co., Dept. CP, 700 Investors Bldg., Minneapolis 2, Minn. . . . or for more information reader may simply check 2672 on the convenient Reader Service slip which is located opposite last page.)

"Care to see your NET weight, Miss Tingle?"

Our appreciation to Ken Boyea, Hercules Powder Co., Holyoke, Mass.

developmental-scale chemical materials

. . . made available in 1956

Chemical materials made available on a developmental, pilot plant, or semi-works scale† last year are described in this list.

An asterisk denotes products that manufacturer states were not available to industry prior to the time he introduced his product, or which had special characteristics not available before that time. Those not marked were previously available, but not from the company indicated.

If you would like additional information on any item, contact manufacturer. Full names and addresses are on page 94.

In looking for materials for specific uses, you'll find it more convenient to first see our "Use-Index," page 44, which is cross-indexed with this list. Find what you want there, then check this list for items with numbers over 500.

†Commercially available chemical materials are listed starting on page 47.

501) **ACETAL RESIN** — Delrin can be injection or blow molded, extruded, machined. Supplied as molding powder. It is a thermoplastic with a number of unusual properties. Dupont Polychem.

502) ***ALLYL CYANIDE** — BP: 111-119°. Exp. Makes resins, pharmaceuticals. Carbide & Carbon.

503) ***ALUMINUM LEVULINATE, BASIC** — Amorphous powder water and alcohol sol. Anti-perspirant, gelling agent for alcohols, makes water-repellants, mordants, dye assistant. Exp. Newport Ind.

504) **N-AMINO ETHYL PIPERAZINE** — 98%. BP: 221°. Makes emulsifiers. Jefferson.

505) ***δ -AMINOBUTYLMETHYLDIETHOXYSILANE** — OrganoFunctional Silane X-1902 contains functional organic groups that are polar. Highly toxic. BP: 233°. Modified organic systems to give advantages of silicones. Exp. UCC Silicones Div.

506) ***AMINOETHYL HYDROGEN SULFATE** — MP: 280°. Exp. For resins that wet-strengthen paper, makes ethylene imine reaction products and polymerics. Modifies cellulosics improving dyability. Carbide & Carbon.

507) ***γ-AMINOPROPYLTRIETHOXYSILANE** — OrganoFunctional Silane X-1901 functions independently as a silane or as a conventional amino ester. BP: 217° Modifies organic systems to improve compatibility, lubrication, stability. Used in finishing agents, pharmaceuticals, pesticides, cosmetics, synthetic resins. Exp. UCC Silicones Div.

508) ***α-ANGELICA LACTONE** — 98+%. BP (30 mm): 75°. For solvents, plastics, plant hormones. Exp. Newport Ind.

509) ***β-ANGELICA LACTONE** — 98+%. Water-sol. For solvents, plastics. Exp. Newport Ind.

510) ***ANHYDROENNEAHEPTITOL** — 70% aq soln. Sl toxic. MP: 138-139°. A humectant. Makes alkyd resins, core oils, explosive rosin ester, drying oil, surface-actives. Celanese.

511) ***ANTHRANILAMIDE** — Intermediate for pharmaceuticals, insecticides. Purified grade melts at 108°. Maumee Chem.

512) ***AZAADENINE** — CP, for biochemical research. Krishell Labs.

513) **BARIUM ETHYL SULFATE** — Pure white crystals are freely sol in water, sl sol in alcohol. Are a sol form of Ba even in presence of sulfate ions. MW: 423.64. City Chem.

514) ***BENZOIC ACID/TOLUIC ACID** — 85:15. MP: approx 106°. Modifier for short and medium oil alkyd resins, raw matl for plasticizers. Oronite.

515) ***BICYCLOHEPTADIENE** — BP: 89.3-104.4°. Undergoes acid catalyzed reactions to form glycols, diethers, diesters. Undergoes free radical additions and polymerizations. Yields cycloheptatriene on pyrolysis. For prep of pharmaceuticals, dyestuffs, resins, and rubber chemicals. Shell Chem.

516) **BIS (CHLOROMETHYL) SULFIDE** — BP: 156°. FP: < -60°. Insol. water. Misc: organics. Makes dyestuffs, lube oil additives, pharmaceuticals. Compound has two reactive chlorines, will alkylate malonic acid esters, chloromethylate aryl thioethers. The sulfide linkage can be converted to sulfonium salts, sulfoxides, or sulfones. Research quan. Stauffer.

517) **BIS (p-CHLOROPHENYL) SULFONE** — 92% pure. Chemical intermediate and larvicide. White crystalline solid melts at 147°. Research quan. Stauffer.

518) **BIS (PHENYL) SULFONE** — 95%. BP: 378°. MP: 124-128°. Intermediate, can be nitrated or sulfonated, resists hydrolysis or reduction. Crystals. Research quan. Stauffer.

519) **BUTADIENE-FURFURAL COPOLYMER** — 90% (mol). $C_{28}H_{18}OCHO$. Uses: insect repellant, synergist for pyrethrin. Phillips.

519A) **n-BUTYL METABORATE** — Tech. US Borax.

520) ***CADMIUM SELENIDE** — Highly toxic. For semi-conductor mfgr. Stoichiometric ratio 1.00. Impurities < 5 ppm. Exp. Merck.

521) ***CADMIUM TELLURIDE** — Semi-conductor. Impurities < 5 ppm. Stoichiometric ratio 1.00. Exp. Merck.

Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
Temperatures are in °C
Solubilities are at room temperature

522) **CALCIUM UNDECYLENATE** — 95+%. Nontoxic powder. MP: 155°. Bacteriostat, fungistat for pharmaceuticals, cosmetics. Baker Castor Oil.

523) ***β-CARBETHOXYETHYLTRIETHOXYSILANE** — OrganoFunctional Silane X-1911 functions independently as a silane or conventional carbethoxy ester. Modifies organics to improve compatibility, lubrication, stability. Low toxicity. BP (741.4 mm): 242°. Use in cosmetics, finishing agents, synthetic resins. Exp. UCC Silicones Div.

524) ***β-CARBETHOXYPROPYLMETHYLDIETHOXYSILANE** — OrganoFunctional Silane X-1913 functions independently as a silane or as a carbethoxy ester. BP: 229°. Modifies organic systems to improve compatability, lubrication, stability. Exp. Silicones Div.

525) ***CATECHOL DIACETATE** — Tech. MP: 61-63°. Pharmaceutical intermed. Exp. Kay Fries.

526) ***CERIUM METAL** — Piglets. 95+%. Nodularizing agent. Mallinckrodt.

527) ***CHLORHYDROXYSTEARIC ACID** — Tech. Saturated fatty acid, liquid with 18 carbon atoms. Swift.

528) **CHLORODIMETHYL SULFIDE** — BP: 105°. Cl is very reactive, replaced by strong bases, sodium alkoxides and amines, alkali metal thiocyanates, dithiocarbonates and xanthates. Sulfide linkage converts to sulfonium salts, sulfoxides or sulfones. Research quan. Stauffer.

529) ***CHLOROKOJIC ACID** — MP: 164-166°. Metal chelates retain fungitoxity, lack irritating properties. Exp. Pfizer.

530) **3,(p-CHLOROPHENYL)-3-PHENYLPHTHALIDE** — For pharmaceuticals, dyes, pigments, surface-actives. Component in lubes, dielectric media, heat exchange fluids. MP: 97-98°. Exp. Am Cy.

531) **COBALTOUS OXIDE** — CoO is a mustard colored powder, insol in water, sol in mineral acids. Uses: in glass discoloration, as pigment, in rapid-drying paints and varnishes. City Chem.

632) **COBALTOUS SELENITE** — $CoSeO_3 \cdot 2H_2O$ is a rose-red powder. Insol: water. Sol: selenous acid, mineral acid, ammonium hydroxide. City Chem.

533) **CRAF MYLONE FUNGICIDE** — Temporary soil sterilant to control weeds, nematodes, soil fungi. Apply dry or as spray. Carbide & Carbon.

(Please turn to next page)

new developmental chemicals

534-551

(*Continued from preceding page*)

534) *3-CYCLOPENTYLPROPANOYL CHLORIDE — Tech. BP (6 mm): 73°. Arapahoe.

535) *i-DECALDEHYDE — Mixed isomers. BP: 197.0°. Modifies phenolic and polyvinyl acetal resins, makes high-mw amines for corr inhibitors, also perfumes. Exp. Carbide & Carbon.

536) *n-DECANAL — 95%. A high mw aldehyde for use in polymers and copolymers, as a modifier in synthetic resins, as an internal plasticizer, in leather treating, as a modifier for starches and proteins, and as an intermediate for plasticizers, surface-actives, dyes, pharmaceuticals, inhibitors, pesticides. Exp. Armour Mkt Devel't.

537) *DEOXYRIBONUCLEIC ACID-C^{14} — For biochemical research. Exp. Schwarz Labs.

538) *DIALLYL AMINE — BP: 110°. Unsat secondary amine for resins, pharmaceuticals, fungicides, textile chemicals. Carbide & Carbon.

539) DIALLYL ITACONATE — Exp comonomer for vinyls, cross-linker for polyesters, other unsaturates. BP: 130 @ 9mm. Contains 1.01% HQ. Pfizer.

540) *4,4'-DIAMINODIPHENYL SULFONE — Purity 95%, MP: 175°. Curing agent for epoxy resins. Imparts high-temp stability. Merck.

541) DI-t-AMYL POLYSULFIDE — Sulfur is 54.7% (wt). Color: 11 Gardner. Polymerization inhib, flotation agent, miticide, solvent, cutting oil. Mw: 295. Sp gr: 1.1383. Phillips.

542) DI-t-BUTYL POLYSULFIDE — Sulphur is 64.0% (wt). Sp gr: 1.0071. Uses: polymerization inhib, flotation agent, miticide, solvent, cutting oil. Phillips.

543) 4-(2,4-DICHLOROPHENOXY) BUTYRIC ACID — Exp. A selective herbicide for broad-leaved weeds in forage legumes. Carbide & Carbon.

544) DICHLOROPROPENES, MIXED — Telone is 95+% mixed isomers, is a nematocidal soil fumigant. Dorlone, a wide-range soil fumigant, is approx 20% Telone in CCl_4. Exp. Dow.

545) DI-t-DODECYL POLYSULFIDE — Sulfur is 37.5% (wt). Black color. Polymerization inhib, flotation agent, miticide, solvent. Phillips.

546) *DIETHANOLAMIDE — Long chain. Monamid 9-34. Thickener for cosmetics, paints, flotation. Mona.

547) *2-DIETHYLAMINOETHANETHIOL HYDROCHLORIDE — 96+%. MP: 170°. For pharmaceutical synthesis. Evans Chemetics.

548) DI-t-HEPTYL DISULFIDE — Chem. intermed, solvent. Phillips.

549) 2,2'-DIHYDROXY-4-METHOXYBENZOPHENONE — UV Absorber 24 is a light stabilizer for PVC, polyethylene, surface coatings. BP: 164-166° @ 1 mm. MP:70-71°. Exp. Am Cy.

550) *DIMETHYL ACETONEDICARBOXYLATE — Chelating agent for prep of pharmaceuticals, insecticides, dyestuffs, amino acids. More stable than parent acid, but should be kept away from alkali and moisture. BP (2 mm): 95-99°. Exp. Pfizer.

551) *DIMETHYL POLYSILOXANE ELASTOMER — Silastic Type K Interlayer for safety glass windshields for supersonic aircraft. Serviceable: -65°F to 350°F. Needs no bonding adhesive. Dow Corning.

(*Please turn to page* 82)

Hardness, chem resistance with coating resins

Uses: As surface-coating resins for paint industry.

Features: Modified with Rezyl alkyds, resins provide good impact and chemical resistance, and maximum hardness.

Description: Resins possess flexibility, high initial gloss, and good gloss retention. They also have good enamel stability, and are reported to have better adhesion than conventional finishes. Resins are compatible with most commonly used pigments which may be dispersed by any conventional method, including roller or pebble mill grinding.

(Cyzac 1006 and 1007 are products of Plastics & Resins Div., American Cyanamid Co., Dept. CP, 30 Rockefeller Plaza, New York 20, N. Y. . . . or for more information check 2674A on form opposite last page.)

Tall oil fatty acid is low in color

Tall oil fatty acid has low color, low saponifiables, low rosin acid content. Typical analysis is 99.1% fatty acids, 0.6% rosin acids, 0.3% unsaponifiables. Gardner color averages 3. Viscosity (SSU @ 100°F) is 105. Composition is:

Linoleic acid	47%
Oleic acid	51
Saturated acid	2

Costing 7½¢/lb (in tankcars at Savannah), product has little tendency to yellow in bakes and overbakes.

(Unitol ACD is a product of Union Bag-Camp Paper Corp., Chemical Sales Div., Dept. CP, 233 Broadway, New York 7, N. Y. . . . or for more information check 2674B on form opposite last page.)

For more information on product at right, specify 2675 . . . see information request blank opposite last page

Cost of foamed-in-place urethanes from liquid components

Nomograph by THE DAYTON RUBBER CO.

Material cost and weight of foamed-in-place rigid, semi-rigid, and flexible urethanes can be determined by this nomograph when liquid components are used.

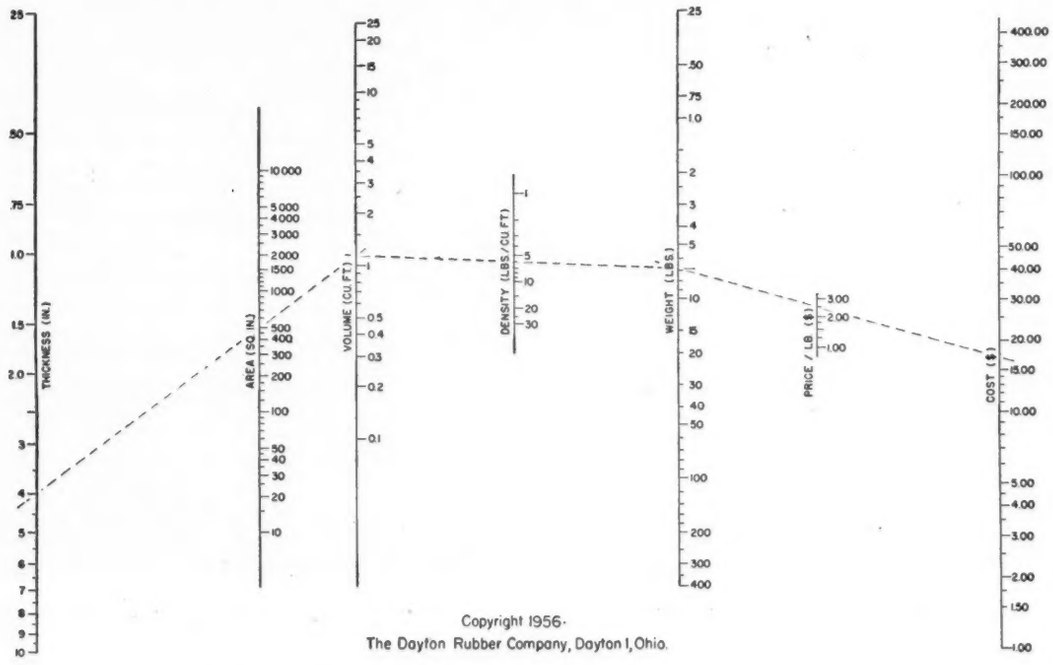
Typical Example

What will be the final weight and total cost of a finished slab of urethane foam that is 4″ thick, 50″ x 10″ in size, and having a density of 6 lb/cu ft? The cost of the liquid components is $2.50/lb.

To determine these, connect 4 on the thickness scale with 500 (50 x 10 = 500 sq in) on the area scale. Extend this straight line to the volume scale. Join this intersection with 6 on the density scale and project the line to the weight scale. This reads 6.9 lb. Join this mark with $2.50 on the price per pound scale and read the total cost, approximately $17, on the scale at far right.

Nomograph was originally developed for Poly-Koolfoam, the trade name of manufacturer's rigid, semi-rigid, and flexible foamed-in-place urethane polymers, but can be used for any urethane foam materials.

Copies of Poly-Koolfoam Costimator are available in 5½ x 8″ pads and may be obtained without cost by writing The Dayton Rubber Co., Dept. CP, Dayton 1, Ohio . . . . or check 2676 on form opposite last page.



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CHEMICAL MATERIALS FEATURE

new developmental chemicals 552-581

(*Continued from page* 80)

552) *DIMETHYL SULFIDE — 99+%. Solvent, odorant, counterodorant. Reacts to form the sulfoxide, sulfone, and chlorides. Low cost. Crown Zellerbach.

553) N,N-DIMETHYLACETAMIDE — Tech. BP (630 mm): 158-161°. Exp. Arapahoe.

554) DI-t-OCTYL POLYSULFIDE — Sulfur: 42% (wt). Color: black. Polymerization inhib, flotation agent, miticide, solvent, cutting oil. Phillips.

555) *DIPENTINE MONOXIDE — *dl*-1-methyl-1,2-epoxy-4-isopropenylcyclohexane 85-88%. BP: 74-76° @ 10mm. Makes insecticides, pharmaceuticals, plasticizers, coatings. Becco.

556) *DIPHENYL HEXYNEDIOL — 95+%. MP: 125-126°. Suds booster and stabilizer in detergents. Makes agricultural chem, aromatics, pharmaceuticals. Air Reduction.

557) DIPHENYLETHYL SULFIDE — Sulfur: 12.67% (wt). Chem intermed, solvent. Phillips.

558) 3,3-DIPHENYLPHTHALIDE — Non-toxic. For pharmaceuticals, dyes, pigments, surface-actives. Component in lubes, dielectrics, heat-exchange media. BP: 283-285° @ 27 mm. Exp. Am Cy.

559) *2,3-DIPHOSPHOGLYCERATE, Ba — Biochemical research. Exp. Schwarz Labs.

560) DISPERSION 33 — Aq suspension, 33%, of high melting synthetic wax. Impregnant, mold release. Imparts solvent and oil resistance to plastics, rubbers. Baker Castor Oil.

561) 1,1-DITOLYLETHANE — An insecticide, plasticizer, solvent, and intermediate. BP: 150°. Toxicity: not hazardous. Exp. Am Cy.

562) DODECENE OXIDE — 90%. BP (3.5 mm): 97-98°. Makes perfumeries, cosmetics, surface-active agents, plastics, lubricants, corrosion inhibitor, stabilizer for chlorinated compounds, monomer. Becco.

563) DOW-ET-14 — O,O-Dimethyl 0-2,4,5-trichlorophenyl phosphorothioate. Insecticide. Research samples only. Dow.

564) DOW-ET-57 — High purity grade of ET-14, above. Systematic insecticide. Research samples only. Dow.

565) *DURENE — 97%. MP: 78.2°. Precursor of high melting, linear polymers. Enjay.

Wanted: Nomographs!
Each could earn $20!

Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? Send it to:

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CHEMICAL PROCESSING pays $20 for each one accepted and published.

566) **DYSPROSIUM OXIDE** — 95%. A spec purity commercial grade for catalysts, ceramics, and alloys. Compound has unique nuclear and ferromagnetic properties: thermal neutron cross section of 1100 barns, and Curie temp of 92°K. Research Chem.

567) **ESTYNOX 300** — Expoxidized castor oil. Stabilizes polymers against yellowing and deterioration. Baker Castor Oil.

568) ***β-ETHOXY ACRYLONITRILE** — Tech. BP (19 mm): 90°. Only stable source for cyanoacetaldehyde. Kay Fries.

569) ***ETHYL AMYL CARBINOL** — BP: 166-172°. A high boiling solvent. Makes plasticizers, oil additives. Shell Chem.

570) ***ETHYNYLENE DICYCLOHEXANOL** — 95+%. MP: 110-112°. For polyesters, pharmaceuticals, aromatics. Air Reduction.

571) ***EUGLENA EXTRACT-C^{14}** — An acetone soln of C^{14}-randomly labeled chlorophylls and lipids. For biochemical research. Exp. Schwarz Labs.

572) ***FLUOROACETIC ACID** — 98%. BP: 163-166°. For microbiological and fungistatic studies and as an intermediate in organic synthesis. Toxic. Exp. Jasonols.

573) ***FLUOROSILICONE RUBBER COMPOUND** — Silastic LS-53 for fabricating rubbery parts and components that have exc resistance to jet fuels, solvents, oils. Dow Corning.

574) ***GLYOXYLIC ACID, HYDRATED** — Tech. Organic pharmaceutical intermed. Kay Fries.

575) **HEXACHLORODISILOXANE** — Colorless fuming liquid is 95+% pure. BP: 133-134°. FP: approx −35°. For making hydraulic fluids, lube oils, silicone resins, anti-foam agents. Research quan. Stauffer.

576) ***2,4-HEXADIENAL** — BP: 170.9°. Chem intermediate. Exp. Carbide & Carbon.

577) **n-HEXANE** — Optically clear solvent for dilution of spectrometer samples. Phillips.

578) **N-HYDROXY ETHYL PIPERAZINE** — 98%. BP: 242°. For pharmaceuticals. Jefferson.

579) **HYDROXYLATED AMIDE WAX** — Flexricin 185, unsaturated, MP: 185°. Antistatic, lubricating agent for plastics, coatings. Alcohol soluble. Baker Castor Oil.

580) **HYDROXYLATED AMIDE WAX** — Paricin 220, saturated, MP: 220°. Antistatic, lubricating agent for plastics, coatings. Alcohol soluble. Resists aliphatics. Baker Castor Oil.

581) **HYDROXYLATED AMIDE WAX** — Paricin 285, saturated. MP: 285°. Antistatic, lubricating agent for plastics, coatings. Resists aliphatics, soluble in alcohol. Baker Castor Oil.

(*Please turn to page* 85)

PIN-POINT, by use, the chemical materials you seek. "Use-Index" is on page 44

MANUFACTURERS' ADDRESSES are on page 94. Contact them for additional details.

REPRINTS of this report are available at $1 a copy, less in quantity.

When inquiring check 2678 opposite last page

Densities of concentrated solutions of zinc bromide

D. S. DAVIS
Professor of Chemical Engineering
University of Alabama

At temperatures from 0 to 100°C, the correlation[2] between density d and percent concentration x of zinc bromide solutions is given by the expression:

$$\log (d - 0.65) = a + bx$$

where a and b depend upon temperature.

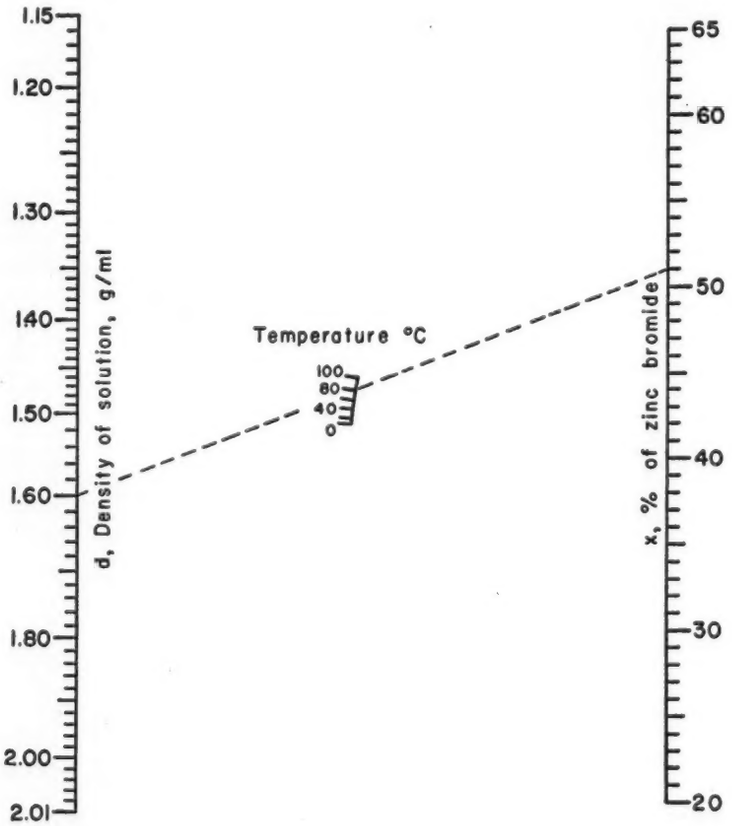
This equation has been solved in the accompanying nomograph by well-known methods[1].

Typical Example

What is the concentration of a solution of zinc bromide if the density is 1.600 at 80°C? Connect 1.00 on the d-scale and 80 on the temperature. Intersection with the x-scale gives a solution concentration of 51 percent zinc bromide.

LITERATURE CITED

(1) DAVIS, D. S., "Nomography and Empirical Equations," Ch 10, Reinhold Publishing Corp., New York (1955).
(2) PERRY, J. H., "Chemical Engineers' Handbook," 3rd ed., p 185, McGraw-Hill Book Co., Inc. (1950).



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(*Continued from page* 83)

582) **HYDROXYLATED AMIDE WAX** — Unsaturated Flexricin 115, MP: 115°. Antistatic, lubricating agent for plastics, coatings. Soluble in alcohol. Baker Castor Oil.

583) **IODINE MONOCHLORIDE** — ICI. Reddish-brown liquid or crystals. Irritating odor. Sol: water, alcohol, ether, CS_2. For chemical syntheses and analyses. MP: 27°. BP: 97°. City Chem.

583A) **ION EXCHANGE RESIN** — Analytical grade for pharmaceutical compounding and manufacturing. Can be used without further purification or processing. Bio-Rad Labs.

583B) **ION EXCHANGE RESIN** — Has EDTA groups. Highly selective for specific ions, for example gives quantitative Na-K separation. For chemical separations and purifications. Bio-Rad Labs.

584) ***ISATOIC ANHYDRIDE** — Purified grade decomposes at 235-240°. Reacts with alcohols, amines, mercaptans. Makes pharmaceuticals, flavors, dyes. Maumee Chem.

585) **ISOPRENE** — 99+% C_5H_8. Sp gr: 0.6808. Readily oxidizable, polymerizable. Uses: butyl rubber, chem intermed. Phillips.

586) ***ISOPROPENYL ACETYLENE** — 97+%. BP: 33.2°. High energy fuel, fuel additive. Makes aromatics, pharmaceuticals. Air Reduction.

586A) **ISOPROPYL METABORATE** — Tech. BP: 47-59°. US Borax.

587) **4-KETOBENZTRIAZINE** — Insecticide intermediate. Tech grade decomposes at 210°. Maumee Chem.

588) ***KOJYL PALMITATE** — MP: 98-99°. Fat-, oil-sol chelating agent. Exp. Pfizer.

589) **LEAD TETRAPHOSPHATE** — Pure and tech $Pb_3P_4O_{13}$. White powder. Insol: water. Sol: phosphorous acid, nitric acid. City Chem.

590) **LEVULINIC ACID** — 95+%. MP: 25°. Makes plastics, solvents, flavors, pharmaceuticals. Newport Ind.

591) ***LINOLEIC DIETHANOLAMIDE** — Monamid 9-124, tech. Unsaturated amide for plastics, detergents, paints. Mona.

592) ***LIPID FRACTION-C^{14}** — Crude, undifferentiated soln. Biochem. Schwarz Labs.

593) ***LITHIUM METAL DISPERSIONS** — Dispersions in paraffin hydrocarbon medium easy to handle. Uses: Polymerization catalyst, making organics and inorganics. Lithium Corp.

594) ***METAXYLYLENE DIAMINE** — 97+%. Ornite MXDA has MP: 13.2-15.6°, is curing agent for

(*Please turn to page* 87)

Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
Temperatures are in °C
Solubilities are at room temperature

Density of concentrated phosphoric acid solutions

by D. S. DAVIS
Professor of Chemical Engineering
University of Alabama

Data[2] on densities, concentrations, and temperatures of concentrated solutions of phosphoric acid can be correlated by means of the equation:

$$d = a + bt$$

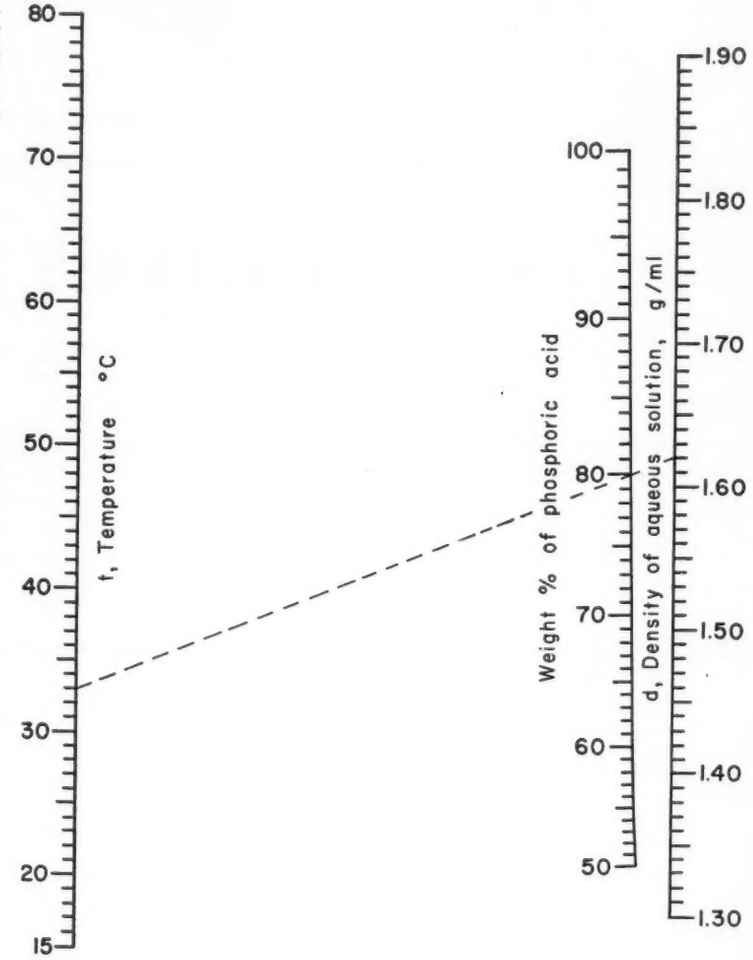
where d = density, g/ml
t = temperature, °C

The accompanying nomograph construction by well-known methods[1] can be used to solve the equation.

Typical Example

What is the density of 80% phosphoric acid at 33°C? Connect 33 on the t-scale and 80 on the percentage scale. Intersection with d-scale is at 1.620 grams per milliliter.

What is the concentration of phosphoric acid if the density is 1.50 grams per milliliter at 51°C? Connect 51 on the t-scale with 1.50 on the d-scale and intersection with concentration scale is at 70.0 percent.



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(1) DAVIS, D. S., "Nomography and Empirical Equations," Ch 10, Reinhold Publishing Corp., New York (1955).

(2) EGAN, E. P., and LUFF, B. B., *Ind. Eng. Chem.*, *47*, 1280 (1955).

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(*Continued from page* 85)

epoxies. Raw material for diisocyanate intermediates and high-mw polyamides; synthetic waxes. Oronite.

595) **METHALLYL ACETATE** — 98%. BP: 124.5°. For organic syntheses. Organic Chem Div FMC.

596) **METHALLYL ACETONE** — 98%. BP: 146-150°. NY Quinine.

597) **METHALLYL ALCOHOL** — 98%. BP: 114.5°. A fumigant. For monomers, copolymers, organic syntheses. Organic Chem Div FMC.

598) ***1-METHOXY-1,3-BUTADIENE** — BP: 90.9°. Exp. For prep of synthetic resins and pharmaceuticals. Polymerized alone or with other vinyl ethers, vinyl acetate. Carbide & Carbon.

599) ***METHYL ISOPROPENYL KETONE** — MIPK tech gr has a 98° BP. Uses: vinyl polymerization. Has low-temp characteristics, toughness, durability. Celanese.

599A) **METHYL METABORATE** — Tech. US Borax.

600) **N-METHYL PIPERAZINE** — 98%. Makes pharmaceuticals. Jefferson.

601) ***N-METHYL PIPERAZINE** — BP: 136°. Pharmaceutical intermediate for antihistamines, tranquilizers, motion sickness remedies. Carbide & Carbon.

601A) **METHYL POLYBORATE** — Tech. US Borax.

602) ***N-METHYL-BIS-(AMINOPROPYL) AMINE** — Chem intermediate. Typical reactions of primary and tert amines. Carbide & Carbon.

603) ***METHYLCYCLOPENTADIENE DIMER** — 94%. BP: 165-180°. For resins and organo-metallics. Precursor of low priced, reactive monomer. Enjay.

604) **3-METHYLHEXANE** — 95%. BP: 91.8°. Uses: organic synthesis. Phillips.

605) **METHYLOLACRYLAMIDE** — As a monomer. MP: 78.5-79°. Mod toxic. Exp. Am Cy.

606) **2-METHYLPENTANOIC ACID** — BP: 196.4°. Exp. Alpha-methyl substitution adds thermal stability to esters. Use: makes synthetic lubes, plasticizers, vinyl stabilizers. Carbide & Carbon.

607) **2-METHYL-1-PENTANOL** — BP: 148.0°. A solvent. Intermed for plasticizers, synthetic lubes, surface-actives, mining chem. Alpha-methyl substitution gives added stability to esters. Exp. Carbide & Carbon.

608) **2-METHYLPENTENE-1** — 99.7% and 99% purities. BP: 60.7°. Intermed. Phillips.

(*Please turn to next page*)

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(Continued from preceding page)

609) **trans-4-METHYLPENTENE-2** — 99.53%. Uses: organic synthesis. Phillips.

610) ***β-MONOALLYL ITACONATE** — Exp comonomer for vinyls, cross linker for polyesters, other unsaturates. MP: 38.9°. Packaged with 0.01% HQ. Pfizer.

611) **MONOSODIUM CYANAMID** — Chemical intermediate. Mod toxic. Approx 85% pure. Exp. Am Cy.

612) **NEODYMIUM OXIDE** — 95%. A spec purity commercial grade for alloying with metals, making quality glasses, prep of specialty chemicals, as catalysts in petroleum and petrochemical reactions. Research Chem.

613) **NICKEL, REDUCED** — Catalyst G-45 is reduced nickel in variety of suspending liquids for use in hydrogenations. Has high activity and selectivity. Girdler.

614) **tert-NONYL MERCAPTAN** — 97.3% (wt). Chem intermed. Phillips.

615) **i-OCTANOIC ACID** — Mixed isomers. Closest methyl substitutions occur in beta position. Intermed for metallic paint driers, non-yellowing alkyd resins, vinyl stabilizers, plasticizers, fungacides, synthetic lubes, water-treating amides. Exp. Carbide & Carbon.

616) **1-OCTENE** — 99.67%. BP: 121.27°. Uses: organic synthesis. Phillips.

616A) **OCTYLENE GLYCOL BIBORATE, TYPE II** — Tech. BP (2 mm): 185-189°. US Borax.

617) **OCTYLENE OXIDE** — 95%. Mixed 1,2- and 2,3-epoxyoctanes are reactive epoxy compounds used to make perfumeries, cosmetics, surface-active agents, plastics, lubricants. Is a corrosion inhibitor, stabilizer for chlorinated compounds. BP (45mm): 76-78°. Becco.

618) ***OLEFIN OXIDE** — 90% C_{16}-C_{18}. BP (0.5 mm): 110°. Reactive epoxy for perfumeries, cosmetics, surface-actives, plastics, lubricants, corrosion inhibitor, stabilizer for chlorinated compounds, monomer. Becco.

619) ***i-PENTANOIC ACID** — Mixed isomers of C-5 acids. Mercaptan solvent. Makes plasticizers, pharmaceuticals, metallic salts, vinyl stabilizers. Exp. Carbide & Carbon.

620) **n-PENTANOL** — BP: 138°. Intermed for pharmaceuticals, plasticizers, synthetic lubes, mining chem, corrosion inhibitors, wetting agents. Exp. Carbide & Carbon.

621) ***PHENYL BUTYNOL** — 95+%. MP: 51-52°. Electroplating bath additive, corrosion inhibitor in H_2SO_4 soln. Intermed for pharmaceuticals perfumeries fine chem. Air Reduction.

622) ***PINACOLONE** — Tech. BP (630 mm): 98-100°. Arapahoe.

623) **PINANE HYDROPEROXIDE** — A peroxide-type catalyst and an intermediate. Exp. BP: 56. S1 toxic. Am Cy.

624) ***α-PINENE OXIDE** — d-2,6,6-trimethyl-2,3-epoxybicyclo 3.1.1 heptane 90%. BP: 61-62° @ 10mm. Makes: insecticides, coatings, plastizers, pharmaceuticals. Becco.

625) **PIPERAZINEDIETHANOL** — 98%. MP: 132-134°. For surface-active agents. Jefferson.

626) ***POLYALKOXY DISILOXANE, INHIBITED** — Hydraulic Fluid 8200 functions from −40°F to 550°F. Good VI. Heat transfer medium. Practically non-toxic. Oronite.

627) ***POLYALKOXY DISILOXANE WITH A DI-ESTER** — Hydraulic Fluid 8515 functions from −65°F to 400°F. Heat transfer medium. Has an oxidation and corrosion inhibitor. Good VI. Good compatibility with commercial elastomers. Oronite.

628) ***POLYARYL POLYISOCYANATE** — PAPI. 97+%. Low-mw polymer for polyurethane coatings, adhesives, foams. Reacts with compounds having activated hydrogen atoms. Carwin.

629) **POLYETHYLENE GLYCOL 200 MONO-RICINOLEATE** —Flexricin 20 is viscosity depressent in vinyl plastisols. Baker Castor Oil.

630) ***POLYVINYL CHLORIDE COPOLYMER EMULSION** — Resyn 25-2507 is non-woven cloth binder and adhesive for vinyl film when plasticized. Has rapid plasticizer absorption. Nat'l Starch.

631) **POTASSIUM METHYL SULFATE** — Pure. Sol: water. $KCH_3OSO_3 \cdot \frac{1}{2}H_2O$. City Chem.

632) ***2-PROPYL-1-HEPTANOL** — BP: 216.3-218.9°. Exp. Defoamer, pigment disperser, solvent medium. Makes plasticizers, diester lubes, oil additives, textile lubes. Carbide & Carbon.

633) **β-RESORCYLIC ACID** — 98+%. Chemical intermediate. Am Cy.

634) **RISOSAN** — A higher alkyl (C_{8-18}) triethyl ammonia tosylate of 99+% purity for use as a plant fungacide and disinfectant. The white powder is odorless, sol in alcohol, MP: 243°. Fine Organics.

635) ***SILICONE EMULSION** — 35% active. Modicol M is low cost mold release agent for rubber, plastics. Doesn't build up on mold. Nopco.

636) **SILICONE, MODIFIED FATTY** — Nopco LLP for non-stick surface treatments, additive to furniture and car polishes. Low cost. Nopco.

637) **SILICONE RUBBER COMPOUND** — 80 duro stock for molded or extruded parts, esp capacitor bushings. 81609 has low compression set, shrinkage. Resists dielectric fluids. GE Silicone.

638) **SILICONE RUBBER COMPOUNDS** — For making parts with improved tensile elongation, tear resistance with low compression set. Short oven cure. Compound 81640 is 50 duro 81641 is 80 duro. GE Silicone.

639) **SILICONE RUBBER SPONGE COMPOUNDS** — 81597 and 81601 are white and neutral colored compounds used to make extruded or molded silicone sponge parts. Excellent handling properties. Give uniform cross-sections of unicellular sponge. Parts can be shaped precisely. GE Silicone.

640) **SUCCINAMIDE** — In formation of resins and as chemical intermediate. MP: 258-259°. Exp. Am Cy.

(Please turn to page 91)

Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
Temperatures are in °C
Solubilities are at room temperature

New polymeric plasticizer simplifies processing . . .

permits use of conventional equipment

Uses: As high molecular weight polyester plasticizer.

Features: Product is said to overcome processing difficulties often encountered in high mw plasticizers. It permits use of conventional equipment. Plasticizer has low extraction and migration properties, low volatility and good electrical properties. It is useful as pigment grinding medium, and has good synergistic effects with other plasticizers.

Description: Having good compatibility, product is primary plasticizer for polyvinyl chloride polymers and copolymers. Physical characteristics are:

Acid number	5 max
Hydroxyl number	15 max
Color (Gardner)	5 max
Viscosity (poises @ 25°C)	550-650

(Emery 3049-S is available from Emery Industries, Inc., Dept. CP, 4300 Carew Tower, Cincinnati 2, Ohio . . . or for more information reader may simply check 2684 on form which is located opposite last page.)

Magnesium pig and ingot available in purities 99.9% and above

Magnesium of 99.9 + % purity, available for use in producing titanium, zirconium, berylium, and uranium, is being made in two Texas plants. Four types are produced: low Mn, low Al, extra low Al, and low Fe.

(High-purity magnesium is product of Dow Chemical Company, Midland, Mich. . . . or for more information check 2685 on form opposite last page.)

For more information on product at right, specify 2686 . . . see information request blank opposite last page.

CHEMICAL MATERIALS

Cotton and wool detergent effective in hard water . . .

nonionic surface-active agent has high stability

Uses: Surface-active agent in textile and paper industries.

Features: Tests show that compound, even in extremely low concentrations, possesses good detergent properties on cotton. Low concentrations of agent also produce effective results when used as woolen piece-goods detergent and as scouring agent for raw wool. Having greater stability under variety of conditions than anionic surface-actives, agent is effective in hard water. It will not form precipitates with calcium and magnesium salts.

Description: Non-ionic surface-active agent was developed through research in ethylene oxide condensates field. Initial concentrations of 5 oz per 100 gal are suggested for cotton and wool scouring. Detergent properties can be considerably increased by addition of a builder.

(Synthrapol PWS is available from Arnold, Hoffman & Company, Inc., Dept. CP, 55 Canal St., Providence 1, R.I. . . . or for more information check 2687 on form opposite last page.)

Reagents, other chemicals for lab, related uses

Digest-size catalog of 92 pages lists manufacturer's line of reagents and other chemicals for laboratory and related uses. Prices for all products are stated. Tables of international atomic weights and weight-volume comparison are included.

Cat 56 is issued by J. T. Baker Chemical Co., Dept. CP, Phillipsburg, N.J. When inquiring specify 2688 opposite last page.

For more information on product at left, specify 2689 . . . see information request blank opposite last page.

new developmental chemicals 641-655

(*Continued from page* 88)

641) *SULFATED ETHYLENE OXIDE CONDENSATE — Nopco Syntergent D is extremely fast wetting. Uses: wetting agent, detergent. Nopco.

642) 4,4'-SULFONYL DIBENZOIC ACID — $(HOOCC_6H_4)_2SO_2$. MP: 300°. White crystalline solid is free flowing, non-hygroscopic. S1 sol: water, common organics. Sol: dimethylformamide, pyridine, dimethylsulfoxide. Forms salts and esters. Suggested for pharmaceuticals, dyes, polyester resins, fibers. Exp. Allied Chem, Gen'l Chem Div.

643) *α-SULFOPALMITIC ACID — 100%. Are used in ore flotation, detergents, lubes. Intermediate for soaps, esters, amides, mixed salts. Contains strong and weak acid groups. MP: 84-88°. Armour.

644) *α-SULFOSTERIC ACID — For ore flotation, detergents, lubricants. Forms soaps, esters, amides, mixed salts. Purity: 100%. MP: 92-95°. Bifunctional. Armour.

645) TEFLON RESIN — Teflon 100X perfluorocarbon resin comes as translucent pellets, can be extruded by common techniques as melt viscosity is low. Dupont Polychem.

646) *1,1,3,3-TETRACYANOPROPANE — Tech. MP: 133-135°. Source for vinylidene cyanide, tetra amino cpds. Kay Fries.

647) *TETRA(2-ETHYLBUTYL) SILICATE — For high-temp hydraulics. Carbide & Carbon.

648) *TETRA(2-ETHYLHEXYL) SILICATE — For high-temp hydraulics. Carbide & Carbon.

649) TETRAMETHYLENEDIAMINE — In prep of synthetic fibers, polymers, and amino resins. BP: 158-160°. MP: 27°. Exp. Am Cy.

650) *TITANIUM DICHLORIDE — A catalyst. Nat'l Lead.

651) *TITANIUM DICHLORIDE DIACETATE — Flame retardant. Also used for treatment of pigment colors. Is easily sol in water. Nat'l Lead.

652) *TITANIUM TRICHLORIDE — A catalyst for organic reactions and polymerizations. Nat'l Lead.

653) TITANIUM TRICHLORIDE — Catalyzes organic reactions and polymerizations, is a strong reducing agent. The dark purple solid is 99+% pure titanium subchlorides (equivalent to $TiCl_{2.9}$). Particle size is 10-100μ. Dec >450°. Research quan. Stauffer.

654) THALLIUM PERCHLORATE — White crystals. Sol: water. CP and tech grades. City Chem.

655) *2-THIOADENINE — CP, for biochemical research. Homolog of a well known metabolite. Krishell Labs.

(*Please turn to next page*)

PIN-POINT, by use, the chemical materials you seek. "Use-Index" is on page 44.

MANUFACTURERS' ADDRESSES are on page 94. Contact them for additional details.

REPRINTS of this report are available at $1 a copy, less in quantity.

new developmental chemicals
655A-677

(*Continued from preceding page*)

655A) TRIALLYL BORATE — Tech. BP (17 mm): 77-80°. US Borax.

656) *TRIALLYL CITRATE — Comonomer for vinyls, crosslinker for polyesters. Packaged with 0.01% HQ. BP: 143 @ 0.4 mm. Exp. Pfizer.

657) TRICHLOROMETHANESULFONYL CHLORIDE — Tech gr melts at 140°. Insecticide uses. Reactive sulfonyl chloride group can be utilized. Stauffer.

658) n-TRIDECANE — 95%. BP: 234°. Uses: organic synthesis. Phillips.

659) *1,1,3-TRIETHOXYHEXANE — BP (5 mm): 85°. Frother in ore flotation. Carbide & Carbon.

660) TRIETHYL ALUMINUM — 90%. BP: 194°. MP: −52.5°. Polymerization catalyst, chem intermediate. Ignitor or fuel in ram-jet or turbojet engines. USI Chem.

661) *TRIFLUOROETHANOL — 98%. BP: 72-76°. For microbiological and fungistatic studies and as an intermediate in organic synthesis. Toxic. Exp. Jasonols.

662) *TRIISOOCTYL AMINE — BP (9.1 mm): For use in extraction of U and heavy metals from sulfate leach liquors. Has unusually low solubility losses. Carbide & Carbon.

662A) TRIMENTHYL BORATES — Tech. BP (0.7 mm): 185°. US Borax.

663) TRIMETHYL ALUMINUM — 95%. BP: 122°. MP: 15°. Ignitor or fuel in ram-jet or turbojet engines. A polymerization catalyst, chem intermediate. USI Chem.

664) 1,3,4-TRIMETHYLBENZENE — Psuedo-cumene. BP: 168-169°. MP: −61°. Uses: Making dyes and perfumes. Research gr: 99.6%. Pure gr: 99%. Tech gr: 95+%. Phillips.

665) TRIMETHYLOLPROPANE — TMP®. MP: 57-59°. Alkyd resins made from TMP have heat stability, flexibility, alkali and detergent resistance, hardness, fast-dry. Also makes drying oils, polyesters, isocyanate resins, plasticizers. Heyden Chem.

666) 2,3,4-TRIMETHYLPENTENE — 95%. BP: 113.5°. For organic synthesis. Phillips.

667) TRIPHENYLSULFONIUM CHLORIDE — Tech. 50% aq soln has 1.14 sp gr. Complexes with most alcohols, glycols and esters, many metal ions, and bromine and iodine. Forms soaps with fatty acids, copolymerizes in phenolic resins. Uses: sequestering agent, surface-active soaps, humectant, dyeing and finishing of natural and synthetic fibers. Research quan. Stauffer.

667A) TRI-(2,6,8-TRIMETHYL-4-NONYL) BORATE — Tech. BP (19 mm): 247-255°. US Borax.

668) n-UNDECANE — 99.33% and 99%. BP: 195.8°. For organic synthesis. Phillips.

Unless otherwise specified . . .

Pressures are in mm of mercury (abs.)
Boiling points are at 760 mm
Temperatures are in °C
Solubilities are at room temperature

669) **n-VALERALDEHYDE** — BP: 103.4°. Makes amines that accelerate rubber cure. Also for preparation of modified polyvinylacetal, phenolic, and urea resins. Exp. Carbide & Carbon.

670) **n-VALERIC ACID** — BP: 187°. For extraction of mercaptans from hydrocarbons. Intermed. for flavors, plasticizers, pharmaceuticals, metallic salts, vinyl stabilizers. Exp. Carbide & Carbon.

671) **γ-VALEROLACTONE** — 98+% BP (30 mm): 106°. Water-sol. For solvents, plastics. Exp. Newport Ind.

672) ***VINYL DECANOATE** — BP (10mm): 92.5-100°. For resins for coatings, textile sizes, adhesives, oil-sol dispersants. Can be copolymerized. Exp. Carbide & Carbon.

673) ***VINYL PROPIONATE** — Tech. BP: 94.9°. For vinyl polymerization. Offers flexible, clear, glossy, adhesive films. Celanese.

674) **o-XYLENE** — 92%. 142-144.5°. Solvent. Intermediate for phthalic anhydride, o-toluic acid. Gives high yields, is low cost. Enjay.

675) **ZINC OXIDE** — Microcrystalline. Purity 98%. Buff red powder for xerography, as semi-conductor. Exp. Merck.

676) ***ZINC SELENIDE** — Impurities under 5 ppm, highly toxic. Stoichiometric ratio 1.00. Manufacture of semi-conductors. Exp. Merck.

677) ***ZINC TELLURIDE** — A semi-conductor. Stoichiometric ratio 1.00. Impurities < 5 ppm. Exp. Merck.

"Easy, Catherine! He wasn't referring to you when he mentioned that d----- silicate!"

use this list for locating . . .

chemical manufacturers

Here are the full names and addresses of manufacturers of the chemical materials described in the listings starting on pages 47 and 79. Use this directory when contacting them about their products.

Abbott Laboratories, 14th and Sheridan Road, North Chicago, Ill.

Abco Chemical Co., 2316 Atlantic Ave., Brooklyn 33, N. Y.

Aceto Chemical Co., Inc., 40-40 Lawrence St., Flushing 54, N. Y.

Air Reduction Chemical Co., 150 E. 42nd St., New York 17, N. Y.

Aldrich Chemical Co., Inc., 3747 N. Booth St., Milwaukee 12, Wis.

Alframine Corporation, 72-76 Putman St., Paterson 4, N. J.

Alkydol Laboratories, Inc., 3242 S. 50th Ave., Cicero 50, Ill.

Allied Chemical & Dye Corp., General Chemical Div., National Aniline Div., 40 Rector St., New York 6, N. Y.

American Alcolac Corp., 3440 Fairfield Rd., Baltimore 26, Md.

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.

American Potash & Chemical Corp., 3030 W. Sixth St., Los Angeles 54, Calif.

Ansul Chemical Co., 1 Stanton St., Marinette, Wis.

Arapahoe Chemicals, Inc., 2800 Pearl St., Boulder, Colo.

Archer-Daniels-Midland Co., 700 Investors Bldg., Minneapolis 2, Minn.

Armour & Company, Chemical Div., 1355 W. 31st St., Chicago 9, Ill.

Armour & Company, Market Development Section, 1425 W. 42nd St., Chicago 9, Ill.

Arnold, Hoffman & Co., Inc., 55 Canal St., Providence 1, R. I.

Bakelite Company, Division of Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

The Baker Castor Oil Co., 120 Broadway, New York 5, N. Y.

J. T. Baker Chemical Co., N. Broad St., Phillipsburg, N. J.

Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

Becco Chemical Div., Food Machinery & Chemical Corp., Station B, Buffalo 7, N. Y.

Bio-Rad Laboratories, 800 Delaware St., Berkeley, Calif.

The Borden Company, Chemical Division, 350 Madison Ave., New York 17, N. Y.

Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass.

Carbide & Carbon Chemicals Co., a Div. of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

Cargill, Inc., 200 Grain Exchange, Minneapolis 15, Minn.

Carlisle Chemical Works, Inc., Reading 15, Ohio

The Carwin Company, Stiles Lane, North Haven, Conn.

Celanese Corporation of America, 180 Madison Ave., New York 16, N. Y.

Chase Chemical Corp., 3527 Smallman St., Pittsburgh 1, Pa.

Chemical Process Co., 1901 Spring St., Redwood City, Calif.

Ciba Co., Inc., Plastics Div., 7535 N. Lincoln Ave., Skokie, Ill.

Colton Chemical Co., 1747 Chester Ave., Cleveland 21, Ohio

Columbia-Southern Chemical Corp., 632 Fort Duquesne Blvd., Pittsburgh 22, Pa.

Commercial Solvents Corp., 260 Madison Ave., New York 16, N. Y.

Coronet Phosphate Co., a Div. of Smith-Douglass Co., Inc., P. O. Box 790, Plant City, Fla.

Cosden Petroleum Corp., P. O. Box 1311, Big Spring, Texas

Crown Zellerbach Corp., Chemical Products Div., Camas, Wash.

Dewey and Almy Chemical Company, Div. of W. R. Grace & Co., Cambridge 40, Mass.

Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio

Diamond Crystal Salt Co., 916 S. Riverside Ave., St. Clair, Mich.

The Dow Chemical Co., Midland, Mich.

Dow Corning Corp., Midland, Mich.

E. I. du Pont de Nemours & Co., Inc., Polychemicals Dept., Grasselli Chemicals Dept., Wilmington 98, Del.

Eastman Chemical Products, Kingsport, Tenn.

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

Emulsol Chemical Corp., 59 E. Madison St., Chicago 3, Ill.

Enjay Company, Inc., 570 N. Broad St., Elizabeth, N. J.

Escambia Chemical Corp., 261 Madison Ave., New York 16, N. Y.

Evans Chemetics, Inc., 250 E. 43rd St., New York 17, N. Y.

Fallek Products Co., Inc., 165 Broadway, New York 6, N. Y.

Farnow, Inc., 4-83 48th Ave., Long Island City, N. Y.

Fine Organics Inc., 205 Main St., Lodi, N. J.

Firestone Plastics Co., Div. of The Firestone Tire & Rubber Co., P. O. Box 690, Pottstown, Pa.

Fisher Scientific Co., 711 Forbes St., Pittsburgh 19, Pa.

Geigy Agricultural Chemicals, Div. of Geigy Chemical Corp., Saw Mill River Rd., Ardsley, N. Y.

General Aniline & Film Corp., Dyestuff and Chemical Div., 435 Hudson St., New York 14, N. Y.

General Electric Co., Chemical & Metallurgical Div., Silicone Products Dept., Mechanicville Rd., Waterford, N. Y.

General Mills, Inc., Chemical Div., South Kensington Rd., Kankakee, Ill.

The Girdler Co., Catalyst Dept., 224 E. Broadway, Louisville 1, Ky.

The Goodyear Tire & Rubber Co., Inc., Chemical Div., Akron 16, Ohio

The Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio

Heyden Chemical Corp., 342 Madison Ave., New York 17, N. Y.

J. M. Huber Corp., 100 Park Ave., New York 17, N. Y.

International Minerals & Chemical Corp., Potash Div., 20 N. Wacker Dr., Chicago 6, Ill.

Jasonols Chemical Corp., 825 E. 42nd St., Brooklyn 10, N. Y.

Jefferson Chemical Co., Inc., P. O. Box 303, Houston 1, Texas

Johns-Manville, 22 E. 40th St., New York 16, N. Y.

Jones-Dabney Co., Resins & Chemicals Div., 1481 S. 11th St., Louisville 8, Ky.

Kay Fries Chemicals, Inc., 180 Madison Ave., New York 16, N. Y.

The M. W. Kellogg Co., P. O. Box 469, Jersey City 3, N. J.

Kentucky Color & Chemical Co., 600 N. 34th St., Louisville 12, Ky.

Koppers Co., Inc., Pittsburgh 19, Pa.

Krishell Laboratories, Inc., 1735 S. E. Powell Blvd., Portland 2, Oregon

Lithium Corporation of America, Inc., Rand Tower, Minneapolis 2, Minn.

A. R. Maas Chemical Co., Div. of Victor Chemical Works, 4570 Ardine St., South Gate, Calif.

Mallinckrodt Chemical Works, 2nd & Mallinckrodt Sts., St. Louis 7, Mo.

Maumee Chemical Co., 2 Oak St., Toledo 5, Ohio

Merck & Co., Inc., Chemical Div., Rahway, N. J.

Metalsalt Chemicals, Inc., P. O. Box 3, Station D, Atlanta 18, Ga.

Minerals & Chemicals Corp. of America, Essex Turnpike, Menlo Park, N. J.

Minnesota Mining & Manufacturing Co., 900 Fauquier, St. Paul 6, Minn.

Mobay Chemical Co., 1901 S. Second St., St. Louis 4, Mo.

Mona Industries, Inc., Paterson 17, N. J.

Monsanto Chemical Co., Plastics Div., Springfield 2, Mass.

Moretex Chemical Products, Inc., 314 W. Henry St., Spartanburg, S. C.

National Aluminate Corp., 6294 W. 66th Pl., Chicago 38, Ill.

National Cylinder Gas Co., 840 Michigan Ave., Chicago 11, Ill.

National Lead Company, 111 Broadway, New York 6, N. Y.

National Starch Products Inc., 270 Madison Ave., New York 16, N. Y.

(Please turn to next page)

Chemical Manufacturers

(*Continued from preceding page*)

The New York Quinine & Chemical Works, Inc., 50 Church St., New York 8, N. Y.

Newport Industries, Inc., P. O. Drawer 911, Pensacola, Fla.

Ninol Laboratories, Prudential Plaza, Chicago 1, Ill.

Nopco Chemical Co., 1st and Essex Sts., Harrison, N. J.

Ohio-Apex Div., Food Machinery & Chemical Corp., Nitro, W. Va.

Onyx Oil & Chemical Co., Warren & Morris Sts., Jersey City 2, N. J.

Organic Chemicals Div., Food Machinery & Chemical Corp., 161 E. 42nd St., New York 17, N.Y.

Oronite Chemical Co., 200 Bush St., San Francisco 20, Calif.

Ottawa Chemical Co., 823 Hamilton, Toledo 7, Ohio

Pennsylvania Refining Co., Karns City, Pa.

Pennsylvania Salt Manufacturing Co., 3 Penn Center Plaza, Philadelphia 2, Pa.

The Permutit Co., 330 W. 42nd St., New York 36, N.Y.

Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N.Y.

Phillips Petroleum Co., Bartlesville, Okla.

Pittsburgh Coke & Chemical Co., Grant Bldg., Pittsburgh 19, Pa.

Refined Products Corp., 624 Schuyler Ave., Lyndhurst, N.J.

Reichhold Chemicals, Inc., RCI Bldg., White Plains, N. Y.

Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., 11 S. Meridian St., Indianapolis 4, Ind.

Research Chemicals Inc., P. O. Box 431, Burbank, Calif.

Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.

Rhodia, Inc., 60 E. 56th St., New York 22, N.Y.

Rhom & Haas Co., Washington Square, Philadelphia 5, Pa.

Schwarz Laboratories, Inc., 230 Washington St., Mount Vernon, N.Y.

Scientific Oil Compounding Co., 1637 S. Kilbourn Ave., Chicago 23, Ill.

Shell Chemical Corp., 50 W. 50th St., New York 20, N.Y.

The Sherwin-Williams Co., Pigment, Color and Chemical Div., 260 Madison Ave., New York 16, N.Y.

L. Sonneborn Sons, Inc., 300 Fourth Ave., New York 10, N.Y.

Spencer Kellogg & Sons, Inc., 98 Delaware Ave., Buffalo 5, N.Y.

Stauffer Chemical Co., 380 Madison Ave., New York 17, N.Y.

K. A. Steel Chemicals Inc., 7450 Stony Island Ave., Chicago 49, Ill.

Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.

Swift & Company, Industrial Oil Dept., 1800 165th St., Hammond, Indiana

Synco Resins, Inc., Henry Street, Bethel, Conn.

Tennessee Corp., 619 Grant Bldg., Atlanta 1, Ga.

UBS Chemical Corp., 491 Main St., Cambridge 42, Mass.

US Industrial Chemicals Co., Div. of National Dis-

tillers Products Corp., 99 Park Ave., New York 16, N.Y.

Union Carbide & Carbon Corp., Silicones Div., 30 E. 42nd St., New York 17, N.Y.

United States Borax & Chemical Corp., Pacific Coast Borax Co. Div., 100 Park Ave., New York 17, N.Y.

Velsicol Chemical Corp., 330 E. Grand Ave., Chicago 11, Ill.

Virginia-Carolina Chemical Corp., Chemicals Div., 401 E. Main St., Richmond, Va.

West Virginia Pulp & Paper Co., Polychemicals Div., P. O. Box 832, Charleston A, S. C.

Westvaco Chlor-Alkali Div., Food Machinery & Chemical Corp., South Charleston 3, W. Va.

Witco Chemical Co., 122 E. 42nd St., New York 17, N.Y.

Wyandotte Chemicals Corp., Wyandotte, Mich.

High rate of electrical conductivity provided by silicone rubber . . .

can be extruded as electrically conductive tube or hose

Uses: As flexible heating element and conductor for draining static charges.

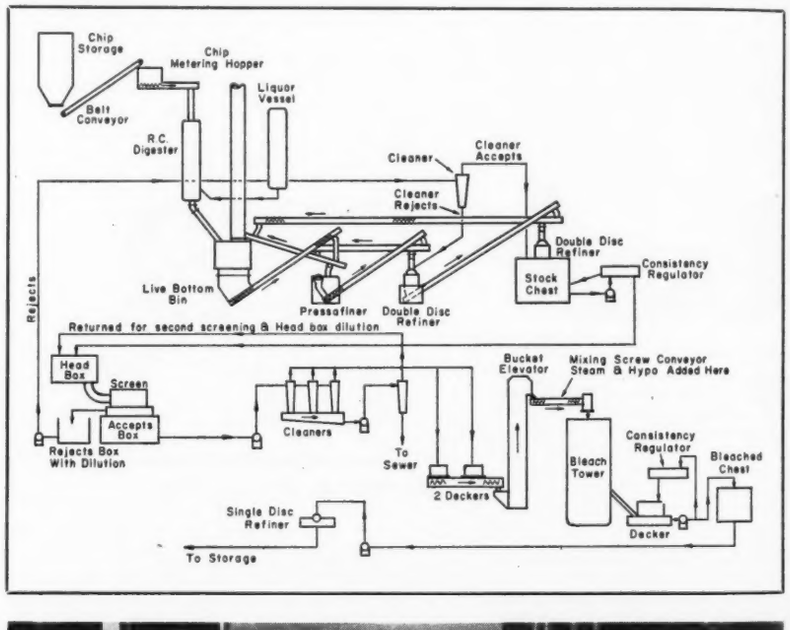
Features: Compound combines electrical conductivity with qualities of other types of silicone rubber. It can be extruded in form of electrically conductive tube or hose, and made into difficult or odd shapes.

Description: Silicone rubber is compounded with carbon black and can be molded, calendered or extruded without appreciably changing its electrical properties. This is in contrast to organic rubbers, which have to be carefully handled to preserve their conductivity. It is resistant to temperatures up to 400°F. As far as is known, there is no flexible, thermosetting material available that can be compounded to provide as high degree of electrical conductivity. Electrical resistivities of less than 100 ohm-cms are easily obtained with this compound.

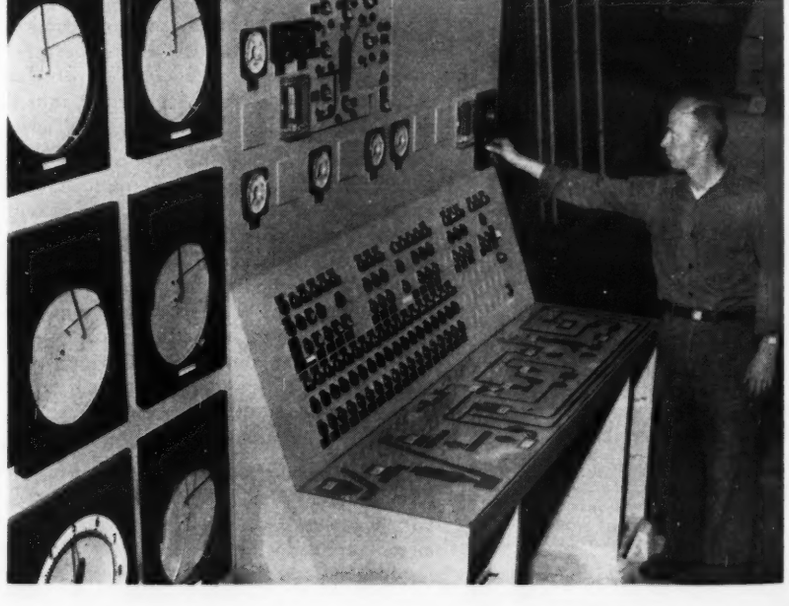
(Silicone rubber X-1516 is product of Silicones Div., Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check 2698 on form opposite last page.)

One of the most important recent developments in the paper industry is now being operated on a semi-commercial basis at Gould Paper Company. Promising greater use of wood resources at lower costs, process . . .

PRODUCES GROUNDWOOD FR



Process produces groundwood pulp from hardwood chips by means of gradual stepwise size reduction. By using pressing and attrition actions instead of abrasion and erosion, higher quality pulp is produced at lower cost



Entire process is operated from centrally-located control panel

OD FROM CHIPS

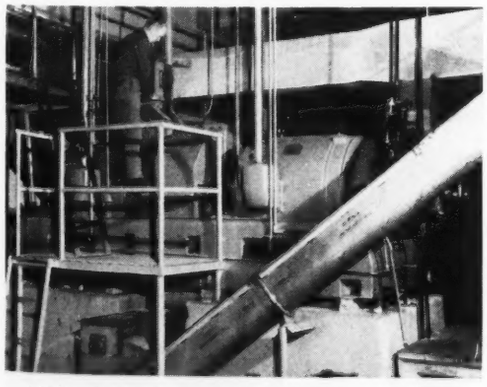
TED F. MEINHOLD, Associate Editor
With **RALPH W. LUETHI,** President
Gould Paper Company, Lyons Falls, New York

Mechanical pulping has emerged from the "stone age" with the advent of a process for making groundwood pulp from chips. The new process with its greater versatility, lower production and initial capital investment costs, eliminates the use of the old stone grinders and may make conventional mechanical pulping techniques obsolete.

Big feature of the process is that it can use any chippable form of wood — resulting in greater utilization of wood resources. At Gould Paper Company, Lyons Falls, New York, where the process has been in operation for over five months, hardwood chips are used. This brightens the outlook for the company since softwood supplies are rapidly disappearing from the area. The pulp being produced is reported to have characteristics similar to those of conventional groundwood, being even better in some respects.

In the process, known as the Bauerite system, hardwood chips are pressure-impregnated with a 2.5% cold caustic solution in a digester. (Digester is not used if softwood is used as feedstock.) Chemical absorption is about 4% sodium hydrox-

(*Please turn to next page*)



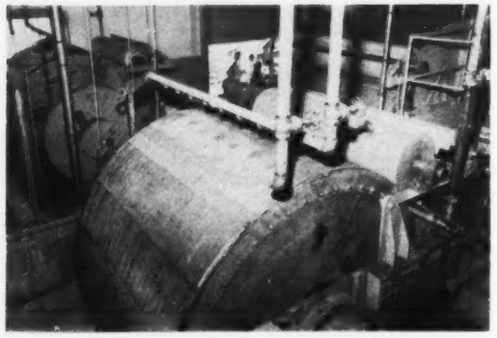
800-hp double disc refiner is used to fiberize the pressed fibers coming from the Pressafiner

Groundwood from Chips

(*Continued from preceding page*)

ide on the wood. A digester yield of approximately 90% is obtained. The digester discharges to a live-bottom bin which meters the chips to a 150-hp, high-pressure screw press (Pressafiner), expelling the spent caustic and moisture from the chips.

The pressed fiber is conveyed to an 800-hp double disc refiner for fiberizing and then to a similar refiner for final brushing. The refined stock is screened, centri-cleaned, thickened, and bleached to 60-65% G. E. Brightness using sodium hypochlorite (7% available chlorine based on pulp). Bleached pulp is washed, diluted to 3%, and passed through a 400-hp single-disc pressure refiner, ready for feeding to the paper machines.



Cleaned stock is dewatered on deckers before being sent to bleach tower

The entire process can be operated from a centrally-located control panel. All cycles of the digester are timed and operated automatically from this board. An indicating light system tells the operator in which stage the operation is at a given time.

Present capacity of the plant is 40 tons per day, but plans are to increase this to 80 tons in the near future. Power consumption for the system has been estimated at 47 HPD/ADT. Location of the new system is in a former sulfite mill.

Most of the pulp produced by this process has been run on Gould paper machines at levels of from 10 to 30% of the fibrous furnish. Generally speaking, the pulp has been used in direct substitution for spruce groundwood. Mullen, tear, and tensile values are somewhat better than on the spruce groundwood. At a freeness of about 300 to 150 cc, the pulp has equivalent strength to spruce groundwood at 90 freeness. Printing results with the paper are said to be better than with former papers.

(Further information on the Bauerite system may be obtained from The Bauer Bros. Company, Dept. CP, Springfield, Ohio . . . or by checking 2703 on form opposite last page.)

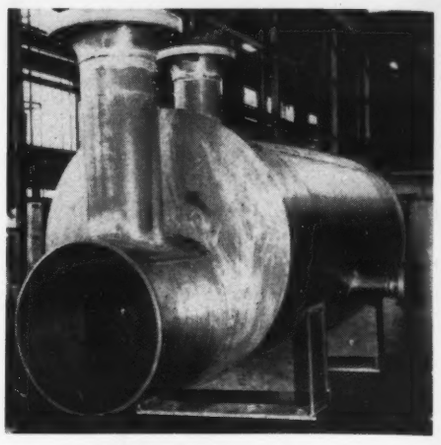
Water pollution control enforcement affects five oil well operators

In first Federal enforcement of new water pollution control program, action has been initiated to halt discharge of oil well wastes into north Louisiana streams. Specially created hearing board recommended operators stop discharging oil well wastes into Corney Creek drainage system within 90 days.

Board found that prior to pollution, Corney Creek waters "were extensively used by the public and private individuals for sport and commercial fishing, recreation, and other beneficial purposes." Discharge of oil wastes made Corney system unfit for any beneficial use. If continued, it would also impair usefulness of 15,000-acre proposed Lake D'Arbonne, for which appropriations were made by Louisiana legislature in 1956.

Board recommended that operators be notified that "a properly constructed, operated, and maintained collection and injection system is a reasonable and equitable method of securing abatement of the pollution of Corney Drainage System." Oil well operators involved are: McAlester Fuel Co., Magnolia, Ark.; Williams, Sellars, & Ewing, Shreveport, La.; E. G. Bradham & C. B. Ragsdale, El Dorado, Ark.; E. G. Bradham and D. E. Bradham, El Dorado, Ark.

Information courtesy of US Department of Health, Education, and Welfare, Washington 25, D.C.



Aluminum heat exchanger cools liquid oxygen

Two all-aluminum heat exchangers have been manufactured for development and test program on propellants for rocket motors. Liquid nitrogen will be vaporized in shell side of shell-and-tube unit at −320°F in order to cool liquid oxygen passing through tubes at approximately −285°F. Shell has ID of 32" and tubes are ⅜" OD. Aluminum was used because of its high Charpy impact values at low temperatures. Design operating pressures are 50 psi on shell side, and 150 psi on tube side.

(Aluminum heat exchangers are manufactured by Griscom-Russell Co., Dept. CP, Massillon, Ohio . . . or check 2706 on form opposite last page.)

High frequency gas discharge process for chemical syntheses announced . . .

applicable to syntheses requiring high activation energy of relatively low temperatures

Formation of new chemical compounds in a gas discharge is reported to be commercially feasible as the result of a recently developed process. The gas phase chemical reactions are carried out in a luminous high-frequency electrical discharge. Process involves the activation, formation and subsequent removal of the product in zones of controlled pressure, temperature, and residence time as the reactant material is passed through a radio frequency field of decreasing intensity.

Most significant aspect of process is that it produces an activated reactant state at temperatures lower than are normally involved when conventional types of activation are utilized. This means that process is particularly suited to syntheses involving high activation energy materials which are difficult or impossible to carry out by conventional means. Since activation energy can be supplied at low temperatures, thermally unstable products can be preserved and recovered.

Take for example, the decomposition of ammonia to form hydrazine. Hydrazine has now been produced under semi-pilot plant conditions at a conversion efficiency of nearly 2% by weight. Although power efficiency is low, this conversion rate is said to be over twice that of any other reported in the literature. It is believed that the work now in progress will improve power efficiencies so that hydrazine production by the process will be more than competitive with existing methods.

The process is operable and has been studied in the range of pressures from 10 to 150 mm of mercury absolute, ambient gas temperatures of from −73 to 100°C, and gas flow velocities of from zero to supersonic speeds. It is presently being operated at from 10 to 50 mm of mercury absolute pressure and 27 megacycles. The process involves the careful maintenance of a pre-determined optimum discharge gap distance in addition to optimum area and composition of surface material in contact with the discharge, reactants and products.

Some possible future applications include production of high energy fuels, making intermediates for high-temperature resistant polymers, and as a research tool for producing rare compounds that are expensive or difficult to make by employing ordinary chemical means.

(Gas discharge chemical process was developed by Lord Manufacturing Co., Dept. CP, 1635 W. 12th St., Erie, Pa.)

Titanium scrap recovered by new process . . .

electrolytic method yields extremely pure metallic product

The titanium scrap market may soon be radically changed with the advent of a new electrolytic process. Up to now, processing of titanium scrap has been plagued by technical difficulties. Presently scrap must be carefully segregated, cleaned, and processed. Oxygen or nitrogen contamination cannot be tolerated.

A large scale pilot plant is now being constructed for testing the process. Known as the Dean-Raney Process, the new method produces an end product consisting of large crystals of pure metal formed on a steel cathode in a heated electrolytic solution. Big feature is that scrap quality appears unimportant. Laboratory tests have shown that many grades of scrap can be refined.

Indicative of the high purity obtained, electrolytic metal with a Brinnel hardness of 60 has been made. Elongations as high as 60 percent have been achieved.

(Pilot plant is being constructed by Mallory-Sharon Titanium Corporation, Dept. CP, Niles, Ohio.)

What factors limit atom development for peaceful purposes?

An opinion poll of American atomic industry has revealed that lack of economic incentive, inadequate insurance protection, and secrecy policies of the government are considered to be three main factors limiting development of atomic energy for peaceful purposes.

The 167 organizations responding to the poll represent approximately 39% of the total contacted. Of these, 43% were manufacturers, 14% were construction-engineering firms, and 13% were utility companies. Remaining 30% included consultant firms, financial institutions, insurance companies, labor organizations, law firms, mining companies, research laboratories, and universities.

(Poll was conducted by Atomic Industrial Forum, Inc., Dept. CP, 3 East 54th St., New York 22, N.Y.)

Nuclear research center completed at Battelle Institute . . .

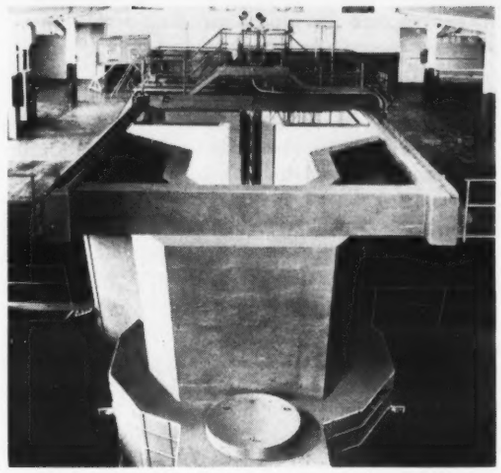
swimming pool reactor is last major piece added

Originally started in 1955, the $3.5 million Nuclear Research Center at Battelle Institute is now in full operation. Third and last major unit to be added is the one-million-watt swimming-pool research reactor. The other two units (hot-cell laboratory and critical assembly laboratory) were completed in 1956. Center is located on a 400-acre site, 15 miles west of the Institute's main Columbus, Ohio, laboratories.

Reactor is housed in three-story building, 72′ wide by 100′ long. The two-section pool in which reactor core is suspended is approximately 20′ wide by 40′ long by 28′ deep. Core, composed of fuel elements and boron control rods, takes up a space about 1′ by 1.5′ by 2′ at the bottom of a support column which is suspended from a movable control bridge.

Fuel elements are composed of uranium-aluminum alloy clad with 2S aluminum. There are ten fuel plates in each element and a total of 35 elements containing, in all, 5.2 kg of enriched U-235. The 28 standard fuel elements contain 162 g each, while the two partial elements (used for fine adjustments in fuel loading) contain 81 g each. The five special elements in which the control rods operate contain about 100 g each.

Depending on core geometry, which is flexible, approximately 2.6 to 3.6 kg of U-235 are used to achieve criticality. At a power level of one megawatt, roughly one gram is burned up each day. It is expected that the reactor will be operated 24 hours a day, six days a week. Cooling, shielding, and controls are all designed for continuous operation at power up to one megawatt. The approximate radiation fluxes at this level are 10^{13} n/cm²-sec for fast and



Giant swimming-pool nuclear reactor has 20′-wide by 40′-long by 28′-deep pool

thermal neutrons and 5×10^{13} photons/cm²-sec gamma flux.

For fast irradiation of relatively small specimens, reactor is equipped with a special "weasel tube". This will operate hydraulically to carry 2″-diameter specimens to and from the core face with a minimum exposure time of about two seconds. For large experiments, the core may be moved to the center of a 20′ by 20′ by 28′ pool area where bulky apparatus may be brought close to its face.

Two 8″- and four 6″-diameter beam tubes extending from the outside vertical walls of the pool through to the face of the core are other spots where specimens may be placed to utilize neutron or gamma radiation. Another location is the graphite thermal column that provides two 4′ openings with a thermal neutron flux of 5×10^{8} n/cm²-sec.

(Information courtesy of Battelle Memorial Institute, Dept. CP, 505 King Avenue, Columbus 1, Ohio.)

Cartoonist Alfred Dishian, Chemical Construction Corp., New York City, tells us an actual occurrence gave him the idea for the above.

Research and development division formed by management group

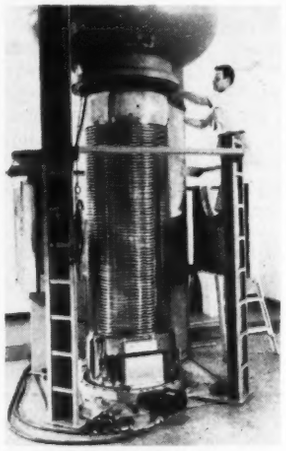
In an effort to help research and engineering executives improve their understanding of management principles, the American Management Association has formed a research and development division. The new division will offer a comprehensive program of meetings and publications in areas of long-range planning, research programming, product creation, research and engineering administration, and product commercialization. Conferences and seminars will be held, and conference proceedings and research reports on current industry practice will be published.

(Information courtesy of the American Management Association, Dept. CP, 1515 Broadway, Times Square, New York 36, N.Y.)

Powerful Van de Graaff accelerator speeds research to develop fuels for atomic age . . .

accelerates electrons to speed of 184, 400 mps

A Van de Graaff accelerator, up to 50 times more powerful than the largest cobalt-60 source in industry, is being used at the Shell Development Company to speed research in fuels and other fields. The unit's three million-volt beam of atomic particles traveling at 184,400 miles per second permits scientists to make studies in minutes or hours that would take too long to be attempted using conventional radiation sources.



Tank housing of Van de Graaff accelerator is lowered into place

The accelerator will aid in developing fuels and lubricants for the atomic age. Generating the same kind of radiation as that given off by atomic reactors, the unit will permit research on the behavior of petroleum products under operating conditions that will prevail in atomic power plants.

Scientists can produce molecular fragments at subzero temperatures with the accelerator, and keep them in crystalline lattices for study at leisure. Energy produced by the machine could possibly be used to create new products.

Housing of the accelerator is a tank 11 feet high and

6 feet in diameter. A fast-moving rubberized belt carries electrons to an isolated terminal at the top of the machine. The terminal is brought to a three million-volt potential, and electrons move from the terminal to a heated filament. Electrons are hurled from the filament through a vacuum tube to bottom of machine. They are then directed through a thin aluminum membrane to target in room on floor below.

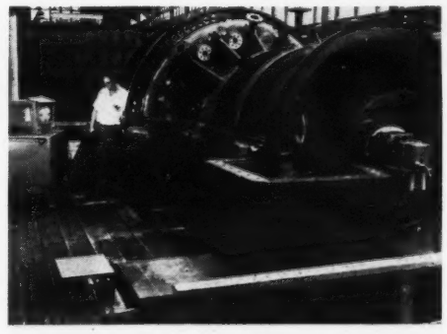
The beam of electrons is diffused to insure even distribution on the target and to avoid melting the aluminum membrane. A closed television circuit and system of mirrors are used to watch operation of machine from control room.

(Information courtesy of Shell Development Company, Dept. CP, Emeryville, Calif.)

Lists accelerator-produced radioisotopes

Various accelerator-produced radioisotopes, along with technical data and availability information, are listed in four-page bulletin. Price list is also included.

Bul 381 is issued by Nuclear Science and Engineering Corp., Dept. CP, PO Box 10901, Pittsburgh 36, Pa. When inquiring specify 2710 on form opposite last page.



Five-ton gas turbine shells aligned by use of TV

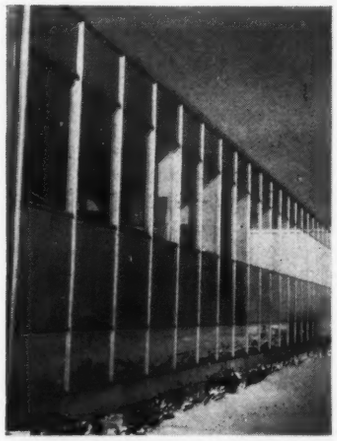
Through the medium of closed-circuit television, five-ton gas turbine sections are correctly and accurately being placed into position. By watching monitor, located some 15 ft from camera, operator is able to carefully adjust shell-connecting bolts, and align the shells. Formerly, turbine shells were aligned by stretching a taut wire through the turbine and estimating when the shells were in position.

(Closed circuit TV system is installed at Gas Turbine Dept., General Electric Co., Dept. CP, Schenectady 5, N. Y.)

Synthetic rubber compound allows expansion room in building joints . . .

resilient material retains adhesion during stresses

A special synthetic rubber compound has been used to advantage in joints of light-panel, drywall buildings constructed in East Montreal for Canadian Petrofina Ltd. These buildings, constructed by M. W. Kellogg Company, remain 100% leakproof despite two years exposure to 90°F heat in summer, and below zero temperatures in the winter. Five such structures were built.



Main administration building of Canadian Petrofina

Synthetic rubber compound was used for filling the 3/32" space between panels and the aluminum sections supporting them. This space allows room for expansion and contraction of the frame without transmitting stresses to the panels. The caulking compound retains adhesion despite these stresses.

Reason this particular compound was chosen was that tests showed it to be resilient over a range from +250 to −65°F. It is waterproof, non-shrinking, and inert to weather and corrosive atmospheres.

(Synthetic rubber caulking compound is product of David E. Long Corp., Dept. CP, 220 E. 42nd St., New York 17, N.Y. Check 2710A opposite last page.)

Belgian acetylene process available in US

A licensing agreement between Blaw-Knox Company and Societe Belge de l'Azote (SBA) of Liege, Belgium, permits use of the Belgian acetylene manufacturing process in the US. Process is reported to be especially suitable for making acetylene from natural gas.

Heart of the system is the patented design burner that limits the formation and deposit of soot. This eliminates frequent shutdowns normally encountered with conventional processes, and reduces operating and maintenance costs. Additional economies are obtained in the acetylene purification step, where ammonia is used instead of expensive solvents.

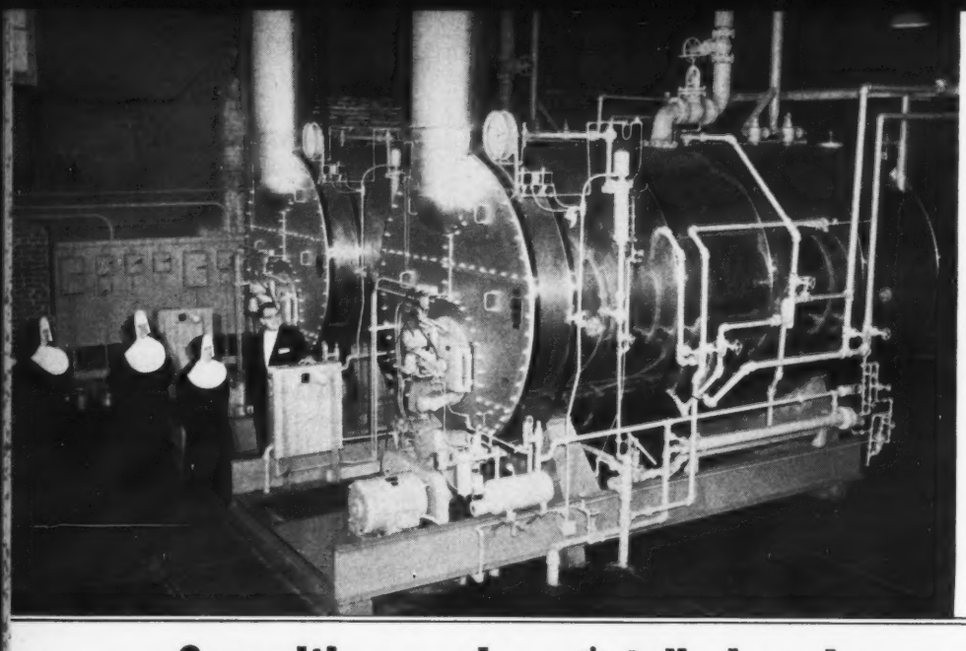
(Additional details on the SBA acetylene process may be obtained from Blaw-Knox Co., Chemical Plants Div., Dept. CP, 300 Sixth Avenue, Pittsburgh, Pa. . . . or by checking 2710B on form opposite last page.)

Lists data for elements used in atomic energy

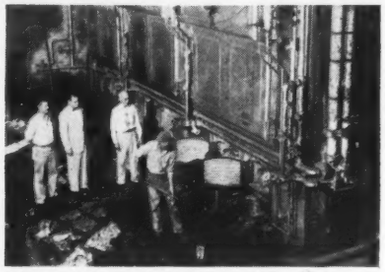
Chart showing properties of elements used in atomic energy is presented in six-page brochure on metallurgical research services and facilities. Services in physical metallurgy, x-ray metallography, chemical and spectrographic analyses, and corrosion studies, among others, are summarized.

"Metallurgical Research and Development" is issued by Nuclear Metals, Inc., Dept. CP, 155 Massachusetts Ave., Cambridge 39, Mass. When inquiring specify 2711 on form located opposite last page.

For more information on product at left, specify 2712 . . . see information request blank opposite last page.



NEW BOILERS combine efficiency and handsome appearance. Edward S. Green, Edgemont (Pa.), contractor, was responsible for this superior installation. Pictured left to right are: Sister M. Cor Immaculatum, Immaculata College Treasurer, Sister Jean Marie, Community Treasurer, Reverend Mother Maria Alma, Superior General and Salvatore S. Guzzardi, Consulting Engineer.



OLD BOILER was a coal-fired HRT model — typical of many replaced by modern Cleaver-Brooks oil, gas or combination oil/gas fired boilers.

Consulting engineer* tells how Immaculata College boiler modernization saves estimated $12,000 each year

Salvatore S. Guzzardi CONSULTING ENGINEER
2928 LEWIS TOWER · PHILADELPHIA 2, PA · KINGSLEY 6-2777

December 20, 1956

Mr. John C. Cleaver, President
Cleaver-Brooks Company

Dear Mr. Cleaver:

Recently our office was retained to make an impartial, exhaustive engineering study of the 40-year old boiler plant and steam system at Immaculata College, Immaculata, Pa., which is staffed by the Catholic order, Sisters of the Immaculate Heart of Mary.

As a result of our recommendations, two fully automatic, oil-fired, 350 bhp Cleaver-Brooks package steam boilers, (12,000 lbs/hr steam each), replaced three hand-fired coal boilers and steam-driven auxiliaries. The new boilers are operating at approximately 80% boiler efficiency year-round.

Conversion of coal firing to automatic #6 oil firing and increased boiler efficiency has reduced the fuel cost approximately 50% -- amounting to a saving of $12,000 each year.

The Cleaver-Brooks boilers burn #6 oil and operate automatically at 80 pounds steam pressure 'round the clock -- without the presence of operators in the boiler room. Eliminating boiler plant labor saves the College $7,500 each year.

The cost of the boiler plant modernization will be paid for out of fuel and labor savings in approximately 2-1/2 years.

Commendation for this outstanding performance of the Immaculata boiler plant is due to your well-engineered boiler design and to the cooperation of your skilled servicemen. The results achieved were so impressive that the Sisters subsequently modernized their Villa Maria Convent, Westchester, Pa., with two 100-bhp Cleaver-Brooks boilers.

Sincerely yours,

Salvatore S Guzzardi

***Salvatore S. Guzzardi** — Award-winning head of an organization of experienced professional engineers specializing in modernizing power service facilities. Clients include: Pennsylvania University, Baldwin-Lima-Hamilton Corp., H. Daroff & Sons, Sun Shipbuilding & Dry Dock Co. and City of Philadelphia.

Surveys show 32% of boilers now in service are 30 years old; 56% are over 20 years old

If your boiler fits this description, we recommend an immediate survey. "In 90% of the plants surveyed," summarizes Mr. Guzzardi, "we have found it possible to save thousands of dollars and to pay for the recommended improvements out of annual savings within one to three years."

Again and again the proved economy of Cleaver-Brooks four-pass, forced-draft boiler design results in savings reports as impressive as this. Contact your nearest Cleaver-Brooks representative for more facts on the complete line of steam and hot water boilers — 19 sizes, 130 models, 15 to 600 hp — for heating or processing. Or write Cleaver-Brooks Company, Dept. D, 349 E. Keefe Ave., Milwaukee 12, Wis., U.S.A. Cable Address: CLEBRO — Milwaukee — all codes

Cleaver Brooks

ORIGINATORS OF SELF-CONTAINED BOILERS

IDEAS

No emulsions are formed with new hydrocarbon refining process . . .

results in better yields, economy

Process has been patented for refining sulfuric acid-treated aromatic hydrocarbons without the formation of emulsions. Method reduces loss of desired aromatics and results in substantial economies over conventional processes.

In the process, acid-treated crude is mixed with 9° Baume' sodium hydroxide which causes the formation of two separate layers. There is no intermediary layer or emulsion. Less caustic is used than needed for neutralization.

Bottom layer (acid) is withdrawn and neutralized with 50° Baume' sodium hydroxide. This layer contains only a minimum of aromatic material and substantially all of the sulfuric and sulfonic acids originally present in the treated crude. These can be recovered by conventional techniques.

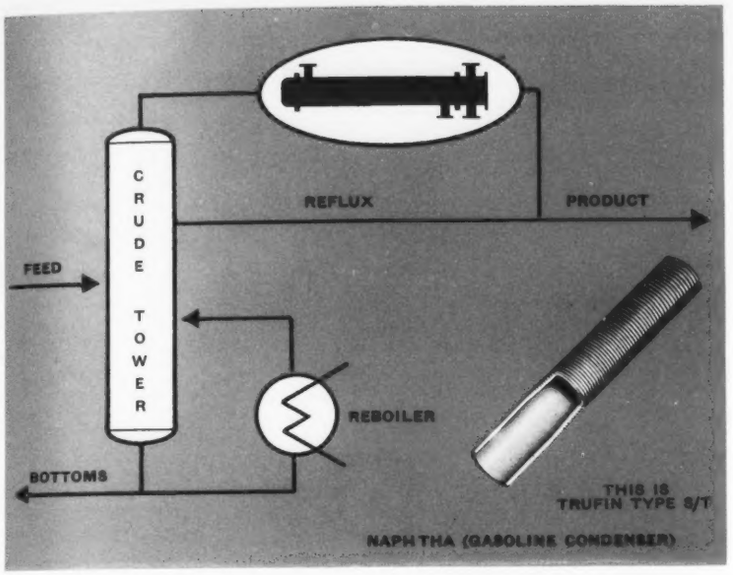
Top layer, containing the aromatics, is neutralized with 9° Baume' caustic and allowed to settle. This again causes two layers to form. Bottom layer (aqueous phase) is withdrawn. This contains about 75 grams sodium sulfite per liter, which can be sold as such or concentrated further, if desired. Aromatic layer (top phase) is sent to fractionating towers where it is separated into benzene, toluene, and xylene.

Process has been in operation for five years at a Houston, Texas, refinery. Typical yield, starting with 4100 gallons of crude aromatics, is as follows:

Benzene (gal)	3255
Toluene (gal)	437
Xylene (gal)	198
High boiling fractions (gal)	60
Losses of refining (%)	3.66

(Hydrocarbon refining process is patented by Oil and Chemical Products, Inc., Dept. CP, 295 Madison Ave., N. Y. 17, N.Y.)

For more information on product at left, specify 2713 . . . see information request blank opposite last page.



WOLVERINE TRUFIN® NAPHTHA CONDENSER ON STREAM FIVE YEARS WITHOUT MECHANICAL CLEANING OF SHELL SIDE

BY ERNEST DODD

Five years of continuous operation, without even a single shutdown for mechanical cleaning on the shell side, is the outstanding record compiled by a naphtha condenser tubed with Wolverine Trufin® Type S/T —the integrally finned condenser tube.

THROUGHPUT UP 70%

Equally impressive is the fact that during this five year period, this Trufin-tubed unit has maintained throughput at a level 70% higher than the former condenser tubed with prime surface tube. In addition, this fine performance was achieved the hard way—under fouling and corrosive conditions regarded, by the processing engineers in charge, as the toughest in the entire refinery. The latest visual inspection showed that the shell side of the bundle was still not in need of mechanical cleaning. When the unit was formerly tubed with prime surface tube it was either cleaned or retubed every year.

The condenser tubed with prime surface tube required 10,916 lineal feet of tube to give a total heat transfer surface area of 2,145 square feet. When Trufin Type S/T was substituted for the plain tube, 10,916 lineal feet of finned tube was also required—but heat transfer surface jumped to 5,420 square feet—*a thumping 152% increase!* In its prime surface form the condenser transferred 5,491,000 BTU's per hour. But when retubed with Trufin heat duty zoomed to 9,340,000 BTU's per hour!

MORE OF SAME ORDERED

Needless to say the processing engineers at this large, Midwest refinery are delighted with Trufin's performance. They are, in fact, so pleased that five additional Trufin units are being installed in other refineries belonging to this company. Three of these will be used in naphtha condensing.

GET THIS BOOK—FREE

The Wolverine Process Flowsheet Book contains both text and illustrations describing actual installations where Wolverine Trufin Type S/T has been successfully used. This book can add to your finned tube information—should be in your files. Write, today!

HOW TO WRITE BETTER HEAT EXCHANGE "SPECS"

By making specifications as complete as possible, engineers can help insure that heat exchange equipment will meet their complete requirements. The following check list can help in writing better specifications:

Fluid—

- Total flow (including percentage of vapor and liquid)
- Analysis (Composition of fluid, or distillation curve and percentage of non-condensibles)
- Specific gravity (or A.P.I.)
- Specific heat at inlet, outlet and average temperature.
- Thermal conductivity at inlet, outlet and average temperature.
- Viscosity at inlet, outlet and average temperature.
- Quality—corrosion and fouling characteristics or fouling factor.
- Molecular weight of vapor.
- Latent heat of vapor; Temperature in—Temperature out; The steam ratio; Steam condensed; Operating pressure; Allowable pressure drop; Quantity of fluid vaporized or condensed.

State particular code requirements or standards which must be met. If own company has standards, supply copy to designer.

In setting allowable pressure drops give as much freedom as the process will allow—it will save you money!

Always give fouling data in terms of fouling factors—never specify as a per cent of clean service.

To be sure of the finest of quality controlled tubing always specify Wolverine condenser tube—in either prime surface or finned (Wolverine Trufin) form.

CALUMET & HECLA, INC.
CALUMET DIVISION
WOLVERINE TUBE DIVISION
FOREST INDUSTRIES DIVISION
GOODMAN LUMBER COMPANY
CALUMET & HECLA OF CANADA LIMITED
CANADA VULCANIZER AND EQUIPMENT COMPANY LIMITED

WOLVERINE TUBE

Division of Calumet & Hecla, Inc.
1469 CENTRAL AVE., DETROIT 9, MICH.
Manufacturers of Quality-Controlled Tubing and Extruded Aluminum Shapes

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA.
SALES OFFICES IN PRINCIPAL CITIES.
EXPORT DEPARTMENT, 13 EAST 40TH STREET, NEW YORK 16, NEW YORK

New way discovered to set-off nuclear reactions

A new kind of nuclear reaction that yields energy and is akin to thermonuclear reactions has been discovered. Described as a "catalyzed nuclear reaction", the phenomenon becomes the third way of making a nuclear reaction take place. The other ways are either to induce thermonuclear reactions, in which two light nuclei fuse into a heavier one when the temperature is raised to about one million degrees, or else to bombard nuclei with other nuclear particles from accelerators like cyclotrons or nuclear reactors.

The new discovery is a way of pulling two nuclei together so that a proton and nucleus of heavy hydrogen can combine to form helium-three with the release of 5.4 million volts energy. The reaction is termed a catalyzed reaction because the mu meson is not consumed by the reaction, but may be ejected from the molecule by the energy released. The meson is then free to catalyze more reactions, in chain fashion.

At the present time, the energy produced in the reaction is only a laboratory phenomenon. The chain of catalyzed reactions cannot continue long enough to generate commercially useful amounts of power because mu mesons decay into other particles after two millionths of a second. Scientists are hoping to discover a much longer lived particle, with properties similar to that of the mu meson. A Russian physicist has already reported evidence for such a particle.

(Catalyzed nuclear reaction development work is being conducted in Radiation Laboratory, University of California, Dept. CP, Monterey, Cal.)

Catalog gives detailed listing of books for management

Listing of books and films on all phases of management is contained in 48-page catalog. Listing provides sources of information on latest developments in specialized fields, solutions to general management problems, and reports on research in all areas of management.

To obtain 1956-57 edition, "AMA Management Bookshelf," write directly to Publication Service, American Management Association, 1515 Broadway, New York 36, N. Y.

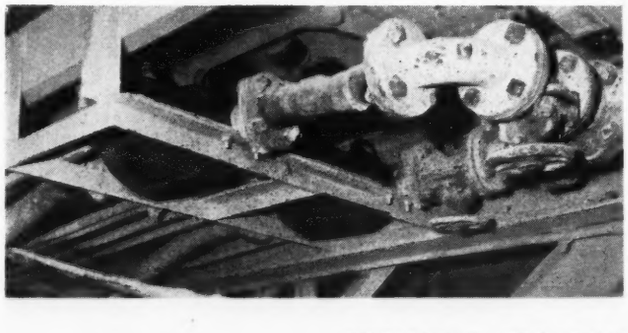
For more information on product at left, specify 2714 . . . see information request blank opposite last page.

It even plugged a purged Venturi, so Swift . . .

meters phosphoric acid slurry—

Problem: Not only is phosphoric acid slurry extremely corrosive, it also has the tendency to deposit suspended solids in meter pressure taps — thwarting conventional attempts to meter flow. Manufacturing triple superphosphate fertilizer, Swift and Company's Agricola Plant near Bartow, Florida, must meter and control phosphoric acid slurry for uniform premixing and process quality control.

Least satisfactory for metering the acid slurry was an orifice plate. Slurries tend to build up against and erode the flow line restrictions needed for differential pressure measurement. A long cone Venturi tube with a water purge to keep pressure taps clear had been found to give the most reliability. Yet even a purged Venturi had been proved inadequate — for the slightest slack in purge pressure



Magnetic flow meter transmitters are installed in phosphoric acid slurry lines

Agricola Plant Food Division of Swift and Company at Bartow, Florida. Plant uses magnetic flow meter to measure phosphoric acid slurry

– magnetically

caused the slurry to set up and harden. Lines had to be removed and literally chopped free before operation could resume. Even with water purge working properly, accurate flow measurement was not assured as partial obstructions could be present and go undetected.

Solution: Two magnetic flow meters were installed in the Agricola Plant lines between filtration stage and premixed tanks. At this point in the process, low grade phosphate rock is mixed with weak phosphoric acid from filtration section. Centrifugal pumps feed partially filtered acid slurry through meters and into contact with phosphoric rock at premix tank. By watching flow records on instrument charts in control room, operator adjusts acid feed valves to maintain uniform acid flow.

Unique design of magnetic flow meter not only averts corrosion problems but also sidesteps problem of flow line restriction. Voltage induced by the conductive phosphate acid slurry moving through a magnetic field is proportional to veloc-

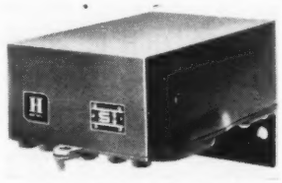
(*Please turn to page* 116)

Converts pneumatic signal from square root meter to linear form . . .

can be used for flow ratio control, or to multiply, divide or square pneumatic outputs

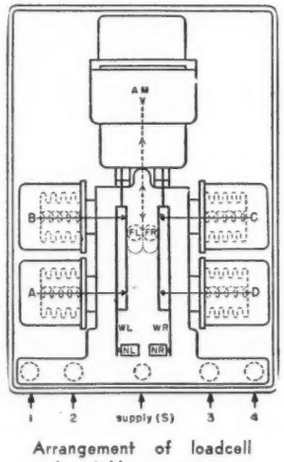
Uses: As computing device for pneumatic measurement or control circuits. Can be used to convert pneumatic signals from square root or linear flow transmitters to desired form, either linear or square root. It can also be used for flow ratio control, or multiplication and division.

Features: Force bridge uses weighbeam system and acts as a null balance instrument. Accuracy is independent of force required to position fulcrum rollers. Feedback reduces frictional effects to a minimum.



Force bridge should be mounted in horizontal position for maximum accuracy

Description: Weighbeam system of force bridge consists of two parallel weighbeams and two fulcrum rollers. Forces are applied to weigh beams by load cells of spring and bellows design, preloaded to three pounds. Fulcrum rollers are positioned by an air motor to keep the system in equilibrium. Movement of weighbeams varies input pressure to air motor which changes fulcrum position to restore equilibrium.



Arrangement of loadcell and weighbeam system. Movement of weighbeams varies input to air motor, changing fulcrum position to develop equilibrium

Force bridge operates with an accuracy of ±½% between 20 and 90% of scale. Sensitivity is 0.1% between 20 and 80% of scale. Instrument will operate with accuracy despite 3 psi variations above and below 20 psi input. Speed of response, for 63% of scale, is 4 sec for one foot of transmission tubing, 6 sec for 15 feet, and 30 sec for 200 feet.

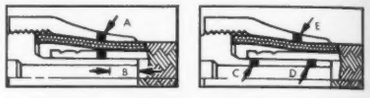
(Sorteberg force bridge is product of Industrial Division, Minneapolis-Honeywell Regulator Company, Dept. CP, Wayne and Windrim Aves., Philadelphia 44, Pa. Check 2719 opposite last page.)

Aeroquip ENGINEERING NOTES

B. A. Main, Jr.

The advertisement at your right says the ***"super gem"*** Fitting is leakproof, and in this column we want to show why we believe this is true.

Three holes equally spaced around the fitting were drilled at A through the socket and through the hose inner tube. This was done to by-pass the lip seal and establish that the fluid would get by the compression area at some pressure level. Subsequent proof tests, using JP-4 fuel, showed that area under compression through length B would leak at approximately 1000 psi.



Next, holes were drilled at C, D and E in other samples to by-pass the compression area and establish the effectiveness of the lip seal.

The hose lines were then aged in air at 500°F for a total of 664 hours. They were checked as follows:

At 118 hours proof tested, using JP-4 fuel at 4000 psi—OK
At 160 hours proof tested, using JP-4 fuel at 4000 psi—OK
At 328 hours proof tested, using JP-4 fuel at 4000 psi—OK
At 664 hours proof tested, using JP-4 fuel at 4000 psi—OK

These tests were conducted on the —8 size. Further tests on other sizes resulted as follows:

—4 Size 504 hours total at 500°F ageing
No leakage at 5000 psi, using JP-4 fuel
No leakage at 29" Hg
Finally burst tests—Sample 1=13,000 psi
Sample 2=12,800 psi
No leakage at fittings before burst
—6 Size 480 hours total at 500°F ageing
No leakage at 5000 psi, using fuel
No leakage at 29" Hg
Burst tests not conducted
—8 Size Aged 106 hours at +500°F, then 24 hours at —88°F, then 360 hours at +500°F.
Checked at each stage:
No leakage at 5000 psi, using fuel
No leakage at 29" Hg
Burst tests—Sample 1=9500 psi
Sample 2=9000 psi
—10 Size 408 hours total at 500°F ageing
No leakage at 4200 psi, using fuel
—8 Size 816 hours total at 500°F ageing
No leakage at 4000 psi, using fuel
—6 Size 672 hours total at 500°F ageing
No leakage at 4000 psi, using fuel

These tests demonstrate that the fitting design is sound. Beyond these tests the conventional tests such as the impulse test, fuel circulation tests and lubricating oil tests have been conducted on all the sizes —3 through —16 successfully, again substantiating the fitting.

Not completed yet is a continuous flexing and constant pressure test that has now been running somewhat over 4000 hours at about +400°F. This test covers four sizes from —4 through —12. We want to complete 6000 hours, after which higher pressure leakage tests and finally burst tests will be run. During the 4000 hours already accumulated there has been no leakage at the fittings.

In all of the tests, the ***"super gem"*** Fitting has not leaked. Compression fittings, both detachable and swaged, tested comparatively in these tests did leak.

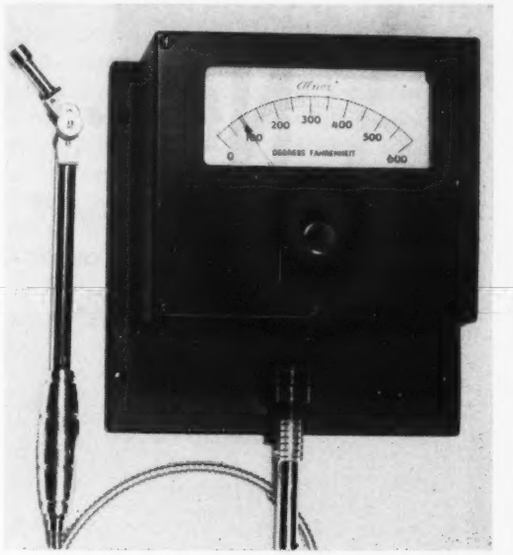
B. A. Main Jr.

VICE PRESIDENT, ENGINEERING
AEROQUIP CORPORATION

Combines flexible convenience of portable pyrometer model with wall-mounted unit

Uses: As contact pyrometer for taking surface temperatures over range from zero to 2000°F.

Features: Wall-mounted pyrometer combines flexible convenience of portable model with instrument protection of a wall-mounted unit.



Pyrometer can be mounted on either panel or wall

Description: Ten standard thermocouples are usable with flexible arm. Instrument scale is five inches long and has bold numerals and sharply defined graduations. Centigrade equivalents and special ranges are also available.

Welded steel case is magnetically shielded, and is gasketed to make it dustproof, fumeproof, and splashproof. Overall size is 8-9/16 x 9⅛".

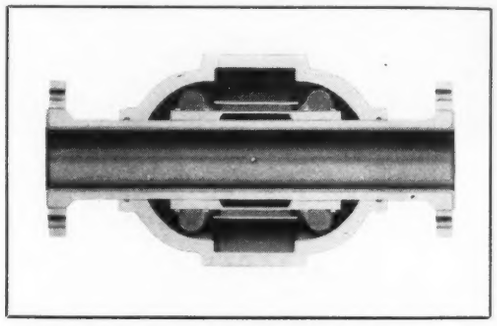
(Type R-4200 pyrometer is product of Illinois Testing Laboratories, Inc., Dept. CP, 420 N. La-Salle St., Chicago 10, Illinois . . . or for more information check 2721 opposite last page.)

Magnetic Flow Meter

(*Continued from page* 113)

ity of the slurry. Field is produced by copper coils and an iron core surrounding a stainless steel tube through which the acid slurry flows. Two electrodes mounted flush with the tube interior detect voltage generated by the flow. Voltage measurement is recorded as a direct, linear measurement of flow.

Since only the electrodes, of corrosion resistant metal, are in contact with the acid slurry, corrosion problems are averted. Inner surface of the stainless steel tube is plastic lined to protect tube against abrasives in the slurry and to prevent short circuiting of generated voltage. Also — there are no pressure taps to become plugged and no restrictions in the tube where slurry could accumulate and solidify. Flow tube is a straight-through section of pipe, identical in diameter to the rest of the lines.



Cutaway of magnetic flow meter transmitter showing unobstructed insulated pipe section with electrode. Fluid contacts only lining and electrodes

With volumetric accuracy within one percent of full scale, flow meter reading is independent of viscosity, density, consistency, turbulence, pressure. Meter has no moving parts, being essentially an electro-magnet which induces a magnetic field through non-magnetic pipe. The two metallic electrodes are mounted flush with inside surface of the pipe and contact the flowing acid slurry. Electrodes are mounted with their axis perpendicular to magnetic field and to axis of the pipe. Flow can be indicated, recorded, or controlled. Changes in liquid conductivity do not affect accuracy of meter so long as minimum conductivity is maintained. Transmitter is equivalent to AC voltage generator and measuring instrument has high input impedance.

Results: Magnetic flow meters have been in operation for more than a year at Swift and Company's Agricola Plant. No more than routine instrument maintenance has been required by the installation. Accurate, dependable flow data and records have been secured. Improved mixing, elim-

ination of caking and plugging of slurry line has increased operation efficiencies. Improved quality control throughout process has become easier.

Electro-magnetic metering of the acid slurry flow has been sufficiently successful that management is considering placing the operation under automatic control. Pneumatic or electric controls can be mounted within the recorder for operation of a suitable valve in acid line.

(Magnetic flow meter is product of The Foxboro Company, Dept. CP, Neponset Ave., Foxboro, Massachusetts . . . or for more information check 2723 on form opposite last page.)

Dielectric testing instruments reviewed in bulletin

Four-page bulletin and two data sheets give specifications of series of instruments designed for dielectric strength testing on production line, in plant maintenance departments, material laboratories, and for use in testing wire and cable installations. Two mobile units, one having output voltage of 0-70,000 volts dc, are covered in data sheets. Three portable bench models are presented in bulletin.

Bulletin 14-2 and Data Sheets 7 & 10 are issued by Associated Research Inc., Dept. CP, 3758 W. Belmont Ave., Chicago 18, Ill. When inquiring specify 2724 on form opposite last page.

Idea submitted by A. A. Schilling, The Remington Arms Co. Inc., Bridgeport, Conn.

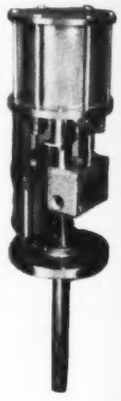
Uses piston action for testing viscosity of sample . . .

elements are applicable to one million cps

Uses: Measuring viscosity under pressure or vacuum. Provides complete viscosity information during polymerization or other processes.

Features: Viscosity measuring elements are applicable for measuring viscosities from 0.1 to one million cps.

Description: Electric-pneumatic viscometer measuring elements operate with piston action to test viscosity of sample. Air lifting mechanism raises piston assembly, drawing sample in through tube openings. Sample then passes through clearance between piston and inside of tube into space at lower end of tube. Lifting mechanism is then quickly lowered. Time required for piston to fall to bottom of tube, expelling sample out same path as it entered, is a measure of viscosity.



Measuring elements are designed for use with manufacturer's recorders and controllers. Models for explosion-proof installations are available.

(Measuring elements are product of Norcross Corporation, Dept. CP, 247 Newtonville Ave., Newton 58, Mass. . . . or for more information check 2727 on form opposite last page.)

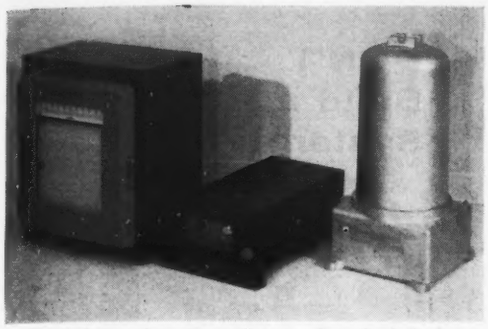
Vapor-phase chromatograph designed for operation in hazardous areas . . .

analyzer is located at sample point; controller can be 500 ft away

Uses: Vapor-phase chromatograph is designed for operation in hazardous areas. Instrument allows plant use of chromatograph techniques to control process operation.

Features: Analyzer of vapor-phase chromatograph instrument is designed to use at sample point in plant. Control unit may be located as much as 500 ft away. Checking of valve functioning or correction of slight long-term drift can be performed at control unit — without visiting analyzer installation.

Description: Vapor-phase chromatograph uses elution method. Fixed sample of gas is introduced into a carrier-gas stream (helium, hydrogen, nitrogen). Sample is washed down through a chromatograph column by continuous flow of carrier gas. Since components in sample travel through column packing at a rate dependent on individual



Vapor-phase chromatograph can be checked for break-down at control unit alone

properties, each component emerges from bottom of column at different times. As each component emerges, its concentration in carrier stream is measured by thermal conductivity cell and is indicated and recorded as a peak.

Analyzer unit, in cast-aluminum housing, includes chromatograph column, detector, sampling valve, and flow control system for carrier gas. Unit has thermostat so that flow can be precisely controlled.

Control unit contains all controls plus the electronic component and timing mechanism to operate the analyzer. After the instrument is programmed, it will operate unattended.

Sampling valve has been designed to introduce sample volumes reproducible to better than ±0.5%. Sample temperature and column temperature are controlled to ±0.5°C. Carrier gas flow-rate variations are held to ±0.1%. Voltage to thermal conductivity cell is regulated to better than ±0.05%.

(Type 26-202 process chromatograph is product of Consolidated Electrodynamics Corporation, Dept. CP, 300 N. Sierra Madre Villa, Pasadena, California . . . or for more information check 2728 on the convenient Reader Service slip which is located opposite last page.)

Information on transducers given in data sheet

Two-page data sheet illustrates and explains pressure transducers and types of recording and measuring instruments for use with these units. Evenly graduated charts can be used for such variables as absolute, differential or gage pressure, level, flow, and altitude. Graph shows resolution and repeatability.

Data Sheet 10.2-6 is issued by Industrial Division, Minneapolis-Honeywell Regulator Co., Dept. CP, Wayne and Windrim Aves., Philadelphia 44, Pa. When inquiring specify 2729 on the convenient Reader Service slip which is located opposite last page.

INSTRUMENTATION

Continuously monitors moisture content of gases . . .

instrument electrolytically measures water in sample

Uses: Measuring minute quantities of moisture in gaseous mixtures. Suitable for monitoring and controlling water contents of cylinder and bottled gases, natural-gas transmission lines, and in gas-phase kinetic studies involving water.

Features: Accurately measures one ppm. Five-step attenuator permits meter readings over full-scale range of 0 to 1000 ppm.

Moisture determinator monitors and controls water content of gaseous mixtures

Description: Instrument contains an electrolysis cell which continuously absorbs and electrolyzes all water in a sample gas stream. Current required to electrolyze the water is related directly by Faraday's law to mass rate-of-flow of water, milliampere meter reading being an indication of water content. Unit's output can be telemetered to remote recorder for monitoring or controlling.

Normal line transients do not affect its operation. Sample flow, at temperatures to 100°C and pressures of 5 to 100 psig, is controlled at selectable flow rate of 100 cc/min. Adjustable output voltage to recorder is 10 to 110 mv full-scale.

(Type 26-301 moisture monitor is manufactured by Consolidated Electrodynamics Corp., Dept. CP, 300 N. Sierra Madre Villa, Pasadena, Calif. . . . or check 2732 on form opposite last page.)

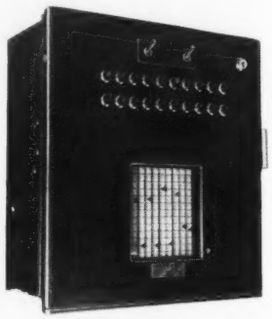
Allows temperature control of four to ten units . . .

multi-point thermocouple controller is suitable for almost any two-position control action

Uses: As multi-point pyrometer controller to allow automatic temperature control of four to ten separate units with one instrument.

Features: Pyrometer controller combines accuracy of null balance potentiometer measuring circuit with speed of electronic control system.

Description: Instrument consists of pulse timer and a selector-switch which automatically connects thermocouples in sequence to master control unit. Each thermocouple voltage is compared to its set point. Master control unit energizes or de-energizes corresponding load relay to process unit, providing accurate temperature control.



Multi-point pyrometer controller can be set to skip one or more points for optional control

Controller can be set to skip one or more points to provide optional control of minimum of four and maximum of ten units. Standard operating speed is three seconds per point, 30 seconds for ten points. Gears for other speeds are available.

Null balance potentiometer measuring circuit can be calibrated independently of thermocouple and extension wire resistance. Many temperature ranges are available between −400° and +3250°F for standard thermocouple calibrations. Temperature ranges are available from −100° to +1600°F for resistance bulbs.

(Multi-point pyrometer controller is product of Thermo Electric Company, Inc., Dept. CP, Saddle Brook, New Jersey. Check 2734 opposite last page.)

Specifications and sizing data for control valves

Details on construction and operating characteristics of manufacturer's control valves are given in 12-page bulletin. Photographs, cutaway and sectional drawings show valve construction. Economy of installation and maintenace is pointed out.

Bul LB-2 is issued by Conoflow Corp., Dept. CP, 2100 Arch St., Philadelphia 3, Pa. When inquiring specify 2735 on form opposite last page.

Instrument cleaning solution will even remove tarnish and finger-prints . . .

is ammoniated soap with auxiliary solvents in organic water-free solvent base

Uses: As instrument cleaning solution to remove oil, grease, dirt, and foreign matter from delicate and intricate metal parts and components.

Features: Instrument cleaning solution and rinsing solution will even remove finger-prints, tarnish, and lapping compound, imparting a brilliant finish.

Description: Cleaning solution is an ammoniated soap with auxiliary solvents in an organic water-free solvent base. It is non-toxic and does not contain any chlorinated solvents. It may be used without any special equipment for ventilation, such as is required when using highly toxic solvents. Cleaning solution's flash point is approximately 100°F.

Rinsing solution is a compound of petroleum-base solvents, formulated to dissolve the cleaning solution from parts being cleaned. It will leave a brilliant finish on the parts. Rinsing solution does not contain any chlorinated solvents, petroleum, ether, or benzol because of possible corrosive action of these materials. Flash point of rinsing solution is over 85°F.

(Power Nofome instrument cleaning and rinsing solutions are products of L & R Manufacturing Company, Dept. CP, 577 Elm Street, Arlington, N. J. . . . or for more information check 2737 on the convenient Reader Service slip which is located opposite last page.)

Mechanical integrator operates with only minute force . . .

floating ring control needs less than 0.5 grams force under varying load conditions

Uses: As mechanical variable speed mechanism suitable for chart integrators, servo mechanisms, variable speed drives, and linear-to-rotary motion converters.

Features: Integrator needs only a minute force to operate (less than 0.5 grams) under varying speed and load conditions.

Description: Floating ring integrator consists of rotating disc, rotating drum, ring encircling the drum, and yoke holding ring in place around the drum. In operation, disc is driven by external means capable of supplying necessary power required at output shaft. Motion is imparted by disc to drum through ring, which makes only point contact with disc. Ring is held firmly between disc and drum by spring loading of disc.

When disc rotates, ring can be tilted about drum axis by tilting control yoke. Ring will then migrate along the drum and face of the disc until it is aligned under controlled point of yoke, perpendicular to axis of drum. This alignment is automatic. Output speed of drum-shaft varies in direct proportion to ring's position from center of disc.

(Floating ring integrator is product of Optimum Engineering Co., Dept. CP, 2017 Willow St., Grand Prairie, Texas . . . or for more information check 2739 on form opposite last page.)

Comprehensive instructions for bayonet thermocouples

Complete set of instructions for selection of bayonet thermocouples and adapters is presented in 10-page bulletin. Applications include temperature measurement of engine and pump-cylinder heads, turbine housings, pipes, electric motors, generators, transformers, plastic extruders and molding machines. Special section contains information on terminals and quick-coupling connectors for all miniature and aircraft thermocouple applications.

Bul 2 is issued by Thermo Electric Co., Inc., Dept. CP, Saddle River Township, Rochelle Park Post Office, New Jersey. When inquiring specify 2740 on form opposite last page.

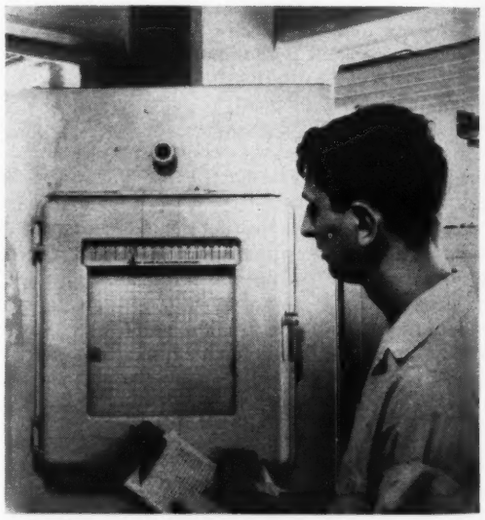
"Something's queer! Periodically it whistles, shudders, and gives forth with a 36-24-36 figure!"

Infrared at Gulf Oil—

Permits 'pipe-lining' analyzed ethylene

Continuous analysis eliminates need to store product when "off-spec" material is found

Problem: Purity of ethylene must be maintained "on-spec" at Gulf Oil Corporation's refinery in Port Arthur, Texas. Gulf sells ethylene as a raw material to chemical companies in the Port Arthur, Orange, Houston, and Texas City areas. Conventional methods of analysis could mean a delay of up to six hours before results were available. Gulf would either have to store product or run the risk of piping "off-spec" product to a customer while a check was being made.



Panel-mounted electronic recorder plots chart record of impurities in ethylene plant product stream

Solution: Continuous infrared analyzer was installed to monitor impurities in ethylene stream that runs from the plant into 130 miles of pipeline. Instrument is calibrated in percentage of combined ethane and methane impurities which might be in the ethylene stream. Should the analyzer detect a predetermined amount of impurity, operators can promptly divert the stream to the plant's fuel system before it contaminates the pipeline. Also, using the continuous analysis record, operators can make adjustments in plant controls to assure production of "on-spec" ethylene.

Operation of analyzer is based on principle that impurity mixture absorbs infrared radiation in proportion to its concentration of impurities. Absorption effect is compared against a standard gas. Difference is converted to electrical signal by differential ther-

mopile. Electrical signal is recorded on panel-mounted instrument as percentage concentration of impurities. Explosion-resistant cast aluminum housing encases entire analyzer assembly. Thermostatically-controlled heater holds temperature a constant 130°F, ±0.1°. Installation also includes an automatic gas standardizer which checks calibration of the analyzer.

Results: Gulf Oil's plant operators have found the system functions well with little maintenance other than routine care. Analyzer's readings check consistently with daily spectrometer analyses — even though the instrument is in an area subjected to constant vibration and stray fields from near-by electric equipment. Company has found there is no need to check grab samples frequently.

(Infrared analyzer is product of Leeds & Northrup Company, Dept. CP, 4901 Stenton Ave., Philadelphia 44, Pa. . . . or for more information check 2742 on form opposite last page.)

Diaphragm receiving gage has rotatable dial

Diaphragm receiving gages with rotatable dial allow rapid detection of minor variations in a process. Photographs and specifications fully describe these gages and other pneumatic instruments in 16-page catalog.

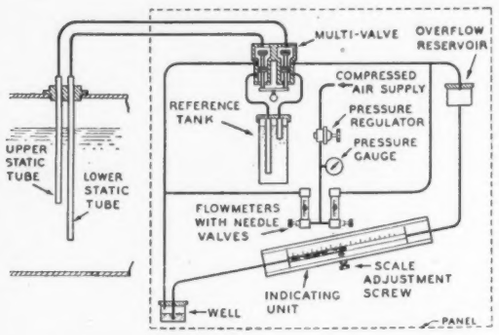
Cat 505 is issued by United States Gauge, Division of American Machine and Metals, Inc., Dept. CP, Sellersville, Pa. When inquiring specify 2743 on form opposite last page.

Gives continuous remote reading of specific gravity . . .

works on principle of differential bubbler; instantly reacts to variations in liquid

Uses: As remote reading specific gravity indicator for continuous measurement of fluid property.

Features: Specific gravity indicator reacts instantly to variations in liquid being measured.



All components of specific gravity indicating system

Description: Indicator operates on principle of differential bubbler. It has two static pick-up tubes (one a predetermined distance above the other) within the vessel containing liquid being tested. In addition to remote static tubes, two more tubes are installed in a small reference tank within the instrument. This tank is filled with a liquid of known specific gravity, selected to be as close as possible to tested liquid. Both sets of static tubes terminate in a multi-port valve.

Indicating system consists of a combined vertical and inclined manometer equipped with an adjustable well and safety overflow. It also has two identical air bubbler generators.

Once system has been set at proper rate of bubbling, position of multi-port valve determines which set of tubes is engaged in indication. With valve in "reference" position, instrument will measure specific gravity of reference liquid. When moved to "main tank" position, instrument takes reading on liquid being tested. Instrument has an accuracy of 0.001 sp gr units, more with interpolation.

Inclined manometer reads specific gravity

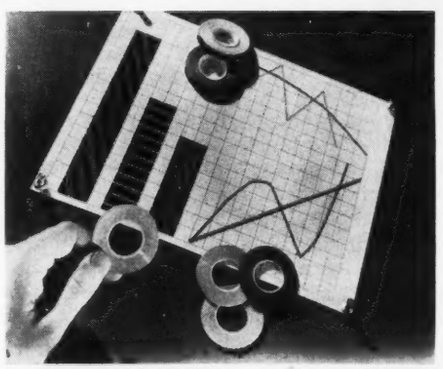
Adjustments are made from front of instrument panel. With exception of 1/8" OD copper tube air supply lines, all tube jumpers are PVC. Reference tank is chrome-plated brass. Cabinet is finished in baked enamel. Components are mounted on aluminum panel within cabinet.

(Specific gravity indicator No. 1561 is product of Petrometer Corporation, Dept. CP, 43-22 Tenth St., Long Island City 1, New York . . . or for more information check 2746 on form opposite last page.)

Tells about thermal conductivity gas analysis equipment

A basic description of direct thermal conductivity method of measurement for process gases is contained in eight-page folder. Typical application examples are cited. Process conditions under which instruments should be used are explained. Performance features and specifications for equipment are included. Photographs and drawings show equipment and installations.

ND46-91(6) is issued by Leeds & Northrup Co., Dept. CP, 4907 Stenton Ave., Philadelphia 44, Pa. Specify 2747 on form opposite last page.



Making charts and bar-graphs

. . . can be easier and faster — more attractive — with use of self-adhesive fiber tapes in various widths, colors, and designs. The acetate tapes are rapidly applied to many surfaces and narrower widths can be easily curved. Once made, graphs can be changed easily by peeling the tape off and replacing with new tape. Fifteen colors, six widths, and nine different designs are available.

(Chart tape is product of American Chart Service, Inc., Dept. CP, 101-103 Dover St., Somerville 44, Mass. . . . check 2748 on form opposite last page.)

Automatic pressure controller is self-contained . . .

has balanced orifice to preserve sensitivity at high capacity with direct action

Uses: As automatic pressure and vacuum controller for stills, evaporators, and reaction vessels.

Features: Controller is entirely self-contained. Instrument has a balanced orifice to preserve sensitivity at high capacity.

Description: Instrument is based on Cartesian timing principle of an inverted float in mercury. Instrument operates similarly to manufacturer's other Cartesian Manostats.

Controller has balanced orifice to preserve sensitivity at high capacity and to permit direct or reverse action. Linear ball bearings are used to reduce friction affecting motion of the float.

Automatic pressure control

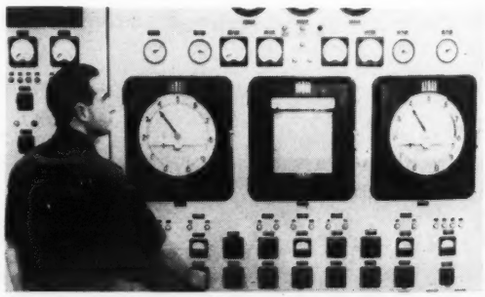
(Cartesian Manostat #10 is product of Manostat Corporation, Dept. CP, 20-26 North Moore Street, New York 13, New York . . . or for more information check 2750 on form opposite last page.)

Assures peak combustion efficiency by measuring oxygen content in flue gases . . .

monitoring system is designed to bring greater fuel economy in industrial uses

Uses: As flue gas monitoring system to assure peak combustion efficiency for greater fuel economy in fuel-air combustion equipment. Applications include power plant boilers, process heaters, cement kilns, SO_2 burners, and steel open hearths.

Features: Flue gas monitoring system uses an accurate analysis of oxygen content as measure of excess air — and automatically adjusts fuel-air ratio to maintain optimum combustion.



Portion of panel board showing oxygen recorder-controllers (the two circular chart instruments at extreme left and right)

Description: Control system has four basic components: one or more units for gas sampling; a gas cleaning unit for each probe; a magnetic-type oxygen analyzer assembly; and an electronic recorder-controller for oxygen.

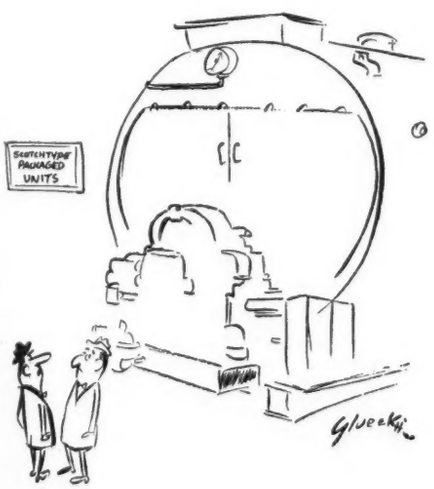
Key component of system is a reverse-jet probe and associated steam sampler. Three water jets from reverse-jet head on probe end keep probe clean with a high-velocity, swirling stream. Steam ejector provides a strong suction to draw flue gas sample into probe and force it at high speed to analyzer.

Jet condenser and centrifugal separator clean flue gas sample which passes to the analyzer through standard copper tubing under pressure of 3 to 6 psig. This line can be up to 200 feet long with as little as six seconds lag in sampling.

Gas sample enters analyzer through separator which removes any condensate formed in sampling line. It then passes through a filter and by-pass assembly which maintains a constant rate of flow to analysis cells.

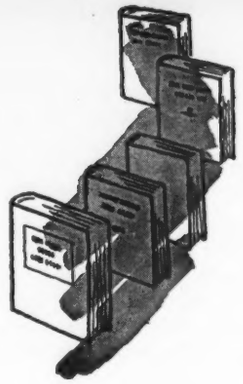
Analyzer measures oxygen content by para-magnetic properties of oxygen. Electronic recorder and controller will automatically adjust fuel-air ratio to achieve maximum combustion efficiency. (Operating personnel can also adjust fuel-air ratio according to data recorded.)

(Flue gas monitoring system is product of Leeds & Northrup Company, Dept. CP, 444 N. 16th Street, Philadelphia 30, Pa. . . . or for more information check 2751 on form opposite last page.)



"Ever considered making a free-trial offer?"

Recent Books



The Encyclopedia of Chemistry

Editors G. L. Clark and G. G. Hawley have directed the work of over 500 authorities from both industry and education in preparing this 1000-plus page encyclopedia covering chemistry, chemical engineering, and closely related fields. More than 850 topics are discussed. These include not only major chemical classes and compounds, but also biographies, technical societies, and other related topics such as atomic power, plastics, air pollution, safety, packaging.

Each section is cross-referenced, and an extensive index makes the volume a readily-available source of information.

To obtain "The Encyclopedia of Chemistry" remit $19.50 *direct to Reinhold Publishing Corp.,* 430 *Park Ave., New York* 22, *N.Y.*

Magnetochemistry

Reviewed by D. S. Davis
Professor of Engineering
University of Alabama

Authoritative, exhaustive, detailed — these adjectives provide a partial description of Pierce W. Selwood's "Magnetochemistry," a distinctive 435-page text in a field unfamiliar to many, though Michael Faraday laid the groundwork more than a century ago.

In this second edition, which deals with magnetic moments and related quantities as applied to chemical problems, the author covers determination and measurement of susceptibility, thermomagnetic analysis, resonance, diamagnetism, diamagnetic anisotropy, paramagnetism, coordination compounds, ferro- and anti-ferromagnetism, and heterogeneous catalysis. Thoroughly documented with a wealth of references certainly not available in another single source, book contains 148 excellent line drawings and is provided with voluminous author and subject indexes.

Throughout, the exposition is clear, no more mathematics is introduced than is needed for adequate understanding, and the arrangement of topics is logical. Author begins each chapter, properly, with introductory matter, and proceeds in well-defined stages through established practice to current theories. The book, which must have been a prodigious undertaking, assures the author of continued leadership in the field of magnetochemistry.

Obtain "Magnetochemistry" remit $11.50 *direct to Interscience Publishers, Dept. CP, 250 Fifth Ave., New York 1, N.Y. When inquiring specify 2754 on form opposite last page.*

Technology and Engineering (Progress in Nuclear Energy —Series IV)

Edited by R. Hurst, AERE, Harwell; and S. McLain, Argonne National Laboratory, this 420-page book is composed of papers prepared by authors from various countries. Most of these papers were presented at the recent Geneva Conference on the Peaceful Uses of Atomic Energy.

Individual chapters deal with heavy water production processes and the production and properties of nuclear grade graphite. There are also papers on beryllia. A section on liquid metals gives detailed discussion of handling precautions for alkali metals, and covers heat transfer from both the theoretical and experimental points of view.

In addition to the above, there are sections on engineering and on reactor chemistry and corrosion. Engineering section reviews heat transfer in boiling water systems and experiences with gas-cooled reactors. Also

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

covered are special pumps for liquid metals, for high-pressure, high-temperature water, and for gases as reactor coolants. Section also includes short discussions on heat transfer and thermal stress problems arising from the canning of a heterogeneous reactor fuel rod.

Each section of book contains from two to nine individual papers. Charts, tables, and flow diagrams are clearly presented. There are about a dozen photographs. Book should make a valuable reference for all those interested in the nuclear field.

To obtain "Technology and Engineering Progress in Nuclear Energy — Series IV", remit $10 *direct to McGraw-Hill Book Company, Inc.,* 330 *West* 42*nd Street, New York* 36, *N. Y.*

He supplies an appendix that includes mathematical aids, a presentation of differential equations and their characteristics, and summarized derivations of the basic equations of motion of a gas in accordance with molecular theory. Thorough familiarity with differential and integral calculus and some experience in applying these techniques are required if one is to get the most from the book and appreciate the really fine job that the author has done.

The index seems adequate, line drawings are excellent, and the printing reflects the high standards of the publisher.

To obtain "Molecular Flow of Gases," remit $7.50 *direct to John Wiley and Sons, Inc., Dept. CP,* 440 *Fourth Avenue, New York* 16, *N. Y. When inquiring specify* 2755 *on form opposite last page.*

Molecular Flow of Gases

Reviewed by D. S. DAVIS
Professor of Engineering
University of Alabama

Material collected for a series of lectures to advanced students in applied mathematics, physics, and engineering at the University of Toronto forms the basis for G. N. Patterson's "Molecular Flow of Gases." In 213 pages that fairly bristle with rigorous derivations, differential equations, and single, double and triple integrals, the author bridges the gap between the continuum and molecular viewpoints without attempting to present a complete discussion of either the kinetic theory of gases or of gas dynamics.

Proceeding from the fundamental equations, Patterson deals competently and at some length with isentropic and nonisentropic flow, and with the mechanics of rarefied gases, but does not include problems for solution by the reader.

Rubber Chemicals

A subtitle might read: "A Guide Through the Extensive and Rapidly Growing Field of Specialized Auxiliary Materials Used in the Rubber Industry."

The book gives chemical and trade names, formulas, suppliers, and properties of accelerators, activators, antioxidants, blowing agents, carbon blacks, emulsifying agents, peptizing agents, retarders, and vulcanizing agents.

The author, J. Van Alphen of Rubber-Stichting in The Netherlands, has managed not only to present a wealth of information in 164 pages, but also gives the complete German translation for everything. The book is published in The Netherlands.

To obtain "Rubber Chemicals" remit $5 *direct to D. Van Nostrand Co., Inc., Dept. CP,* 120 *Alexander St., Princeton, N.J. Check* 2756 *on form opposite last page.*

BROMINE

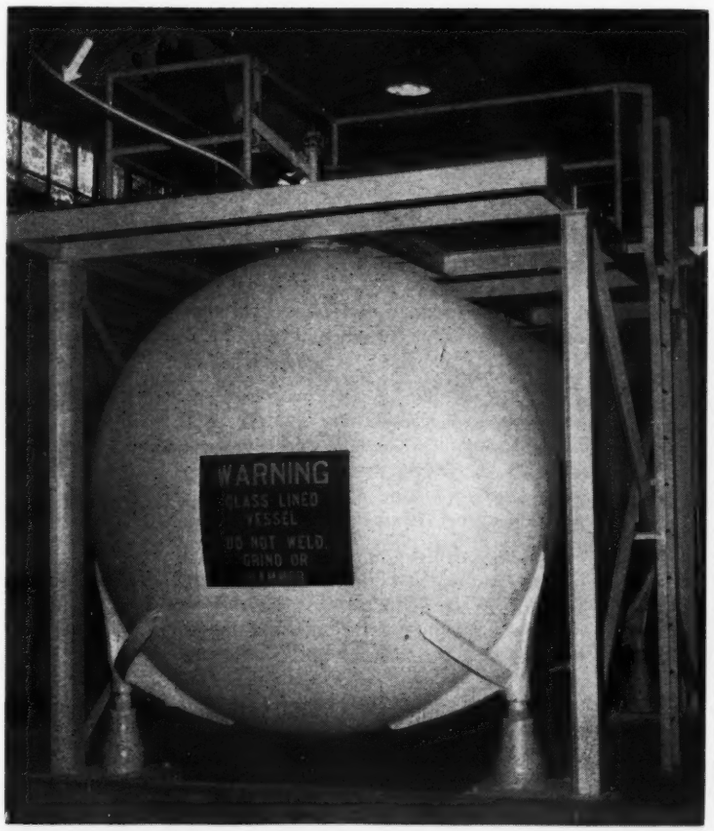
not too tough for Teflon pipe

Corrosive gas withstood by the plastic pipe, which has the added advantages of flexibility and of not being affected by vibration

GORDON WEYERMULLER, Associate Editor
With **C. A. SCHLAUDT,** Corrosion Engineer
American Potash & Chemical Company
Trona, California

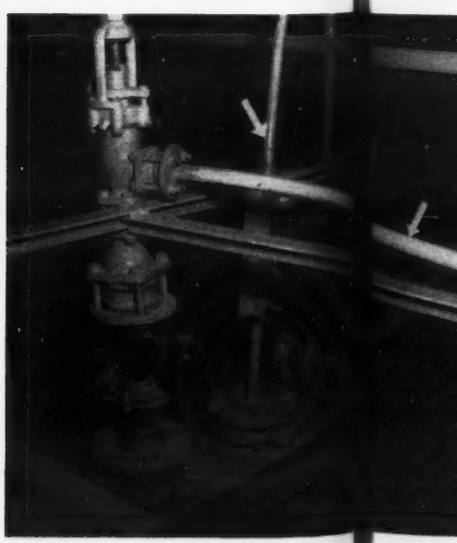
PROBLEM: Biggest drawback of previous non-metallic piping used in bromine plant at American Potash was breakage due to being accidentally hit by heavy objects. Even more frequently breakage occurred from vibrations caused by operation of centrifuges in an adjacent process.

In the plant where this piping was used, bromine is stripped from a hot (200°F) potassium chloride



◀ Arrows indicate Teflon lines leading to glass-lined storage vessel for bromine. Note how flexibility of the plastic pipe is used to advantage in line at left

Another example of Teflon pipe used in bromine plant ▼



solution by displacing the bromine with chlorine gas in a set of granite towers. Bromine that comes off top of these towers passes through a series of condensers, then a set of small storage vessels. Eventually the bromine enters a large, glass-lined storage tank prior to being loaded into small shipping drums or bottles.

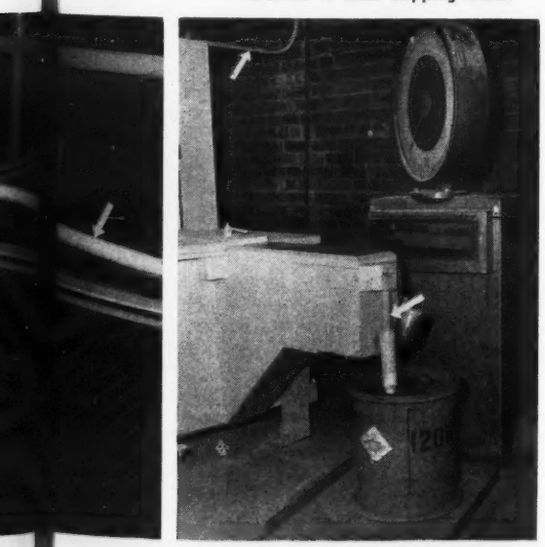
Bromine is a very corrosive material in its own right. It is made even more so in some of the final processing steps when sulfuric acid is added as a drying agent. Piping was needed that could satisfactorily withstand these corrosive conditions and the vibration.

Solution: Plant installed Teflon pipe for handling the bromine gas. One place Teflon pipe was used was for transfer lines between some of smaller storage vessels. It was also used for feed and discharge lines from final storage tank and for air pressurizing line on top of this same tank. Vapor traps in condenser system lines are also Teflon.

Results: Teflon pipe is in excellent condition. It has not been affected by the corrosives handled or by vibration. It has the added advantage of being flexible, which allows the use of long lengths that will go around corners and thus materially reduce the number of joints required.

(Teflon pipe is product of W. S. Shamban & Company, Dept. CP, 11617 W. Jefferson Blvd., Culver City, Calif. . . . or for more information check 2759 on form opposite last page.)

Teflon pipe (arrows) is used to carry bromine to small shipping drums



Low plasticizer content of coating increases chemical resistance . . .

vinyl withstands acids, bases, salts, fumes, and moisture

Uses: For coating metal ducts, hoods, sheet stock, and equipment.

Features: Low plasticizer content of coating makes it harder, with less tack and greater chemical resistance, than is possible with comparable formulations with higher plasticization.

Description: Organosol coating formulation is based on Pliovic AO vinyl dispersion resin. Coating is formulated with 35 parts of plasticizer per 100 parts of resin. Incorporation of chemically stable pigments permits coatings which are decorative as well as protective. Material is resistant to many acids, bases, metallic salts, moisture, and corrosive fumes. It may be brushed on or spray-applied.

(Vinyl coating formulation is development of Chemical Div., Goodyear Tire & Rubber Co., Dept. CP, Akron 16, Ohio . . . or for more information check 2761 on form opposite last page.)

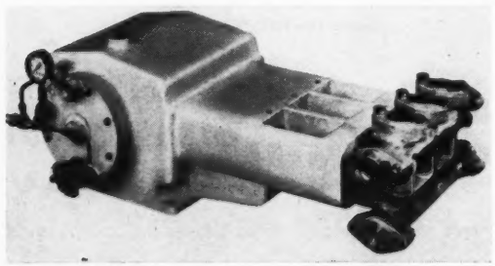
Pumps corrosive slurries at viscosities as high as 40,000 cps . . .

ceramic or special alloys can be employed in place of Stellite valve trim

Uses: For applications in the chemical and food fields.

Features: Pump can be used to handle corrosive slurries at viscosities up to 40,000 cps. Transparent cover on end of crankcase permits inspection of entire power end while in operation.

Description: One of the chief advantages of the triplex pump is that the standard design may be varied to meet individual service conditions. Standard material for liquid end is 316 stainless steel with Stellite valve trim. Other materials of construction and drive may be specified by customer.



Pump is suitable for a variety of pumping operations

When inquiring check 2762 opposite last page

Three single-acting cylinders are available in four bores. Maximum capacities range from 10 to 30 gpm and maximum pressures from 450 to 1500 psig.

(Triplex pump is product of Votator Div., The Girdler Co., Div. of National Cylinder Gas Co., Dept. CP, 224 E. Broadway, Louisville 1, Ky. . . . or for more information check 2763 on form opposite last page.)

Dual corrosion resistance results with laminates of various metals . . .

may increase heat transfer, lower costs, or provide other advantages

Uses: One typical application for the laminates is in heat exchangers where both heat transfer and resistance to dual corrosion are of prime importance. They also have a number of other chemical uses as well as application in the nuclear and guided missiles fields.

Features: Combined metals offer physical chemical, and mechanical properties that are impossible to get in a single metal.

Description: Laminates are combinations of two or three metals chemically and metallurgically bonded together. Combinations of such metals as stainless and mild steels, Monel, copper, brass, titanium, and many others can be successfully bonded in laminates of various thicknesses. Laminates have high bonded shear strength. From an economy point of view, by laminating a thin sheet of expensive metal to a thick sheet of lower cost metal, overall cost of laminate is reduced.

(Metal laminates are product of Bridgeport Brass Co., Dept. CP, 30 Grand Street, Bridgeport 2, Conn. . . . or for more information check 2764 on form opposite last page.)

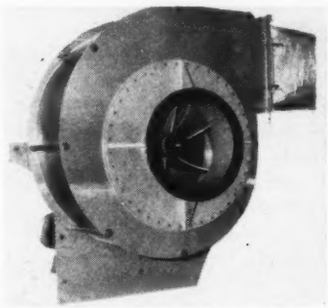
When inquiring check 2765 opposite last page

A capacity of 15,000 cfm offered by PVC blower of 40" diameter

Uses: Expelling corrosive air and fumes from industrial installations.

Features: Corrosion-resistant centrifugal blower has a capacity of 15,000 cfm. Housing and impellers are constructed from unplasticized polyvinyl chloride.

Description: Centrifugal unit has a diameter of 40". It is designed with back curve, non-overloading characteristics which maintain high efficiency. PVC shaft seals are provided to give long service life to main drive shaft. Inlet and outlet flanges, gaskets, and drain plugs are standard PVC parts.



Blowers, housing and impellers are constructed of unplasticized polyvinyl chloride

(Model CB-40M blower is a product of Industrial Plastic Fabricators, Inc., Dept. CP, Endicott Street Norwood, Mass. Check 2766 opposite last page.)

Bolts, rivets, screws resist corrosion

Stainless steel, corrosion-resistant bolts, rivets, and screws are covered in 12-page catalog. Illustrations, stock sizes, and dimensions of items are included.

"'AN' Stainless Steel Fasteners" is issued by Allmetal Screw Products Co., Inc., Dept. CP, 821 Stewart Ave., Garden City, L.I., N.Y. When inquiring specify 2767 opposite last page.

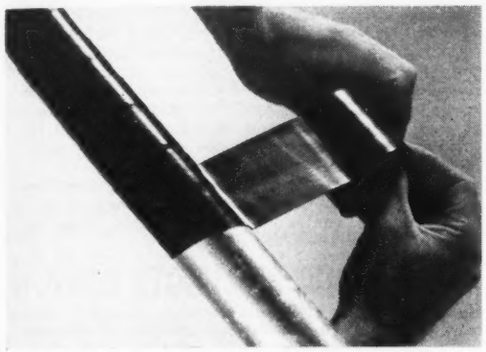
When inquiring check 2768 opposite last page

Microbiological deterioration, electrolytic attack resisted by polyethylene tape . . .

wrapped on pipe, it gives a tight, firm coating that provides protection

Uses: Tape can be wrapped on pipe used for a variety of applications.

Features: It resists electrolytic attack and microbiological deterioration, and does not leach out when buried in the earth.



Polyethylene tape permits a minimum of moisture absorption or penetration

Description: Tape is extruded of Tenite polyethylene. It can be applied by either manual or mechanical means. No heat is required. A noncorrosive adhesive is bonded to one side of the polyethylene to make it ready to use. Wrapped spirally on pipe with proper tension, tape gives a tight and firm coating.

(Safe-T-Clad tape is product of F.O.S. Industrial Tape Div., The Seamless Rubber Co., Dept. CP, New Haven 3, Conn. . . . or for more information check 2769 on form which is located opposite last page.)

Molybdenum sheet available from stock . . .

materials come in seven thicknesses

Molybdenum sheet metal is available from stock in a premium grade noted for its ductility, malleability, and deep drawing qualities. Stocks are maintained in seven thicknesses. Sheet is usually supplied in the annealed state although unannealed metal can be furnished when specified.

(Molybdenum sheet is product of Fansteel Metallurgical Corp., Dept. CP, N. Chicago, Ill. . . . or for more information check 2770 on the convenient Reader Service slip which is located opposite last page.)

VYFLEX *FLIGID*® lining

stops sodium hypochlorite

The problem solved by lining the tank shown above with Fligid is particularly important because it is so widespread. Invaluable as an industrial bleach, sodium hypochlorite has a voracious appetite for just about every known lining or coating material. The bleach decomposes some on contact. It permeates others, raising gas blisters that force the lining away from the tank wall.

But nothing happens to *Fligid!* Sodium hypochlorite is completely powerless against this amazing new laminate of two different Polyvinyl Chloride based membranes. Furthermore, the cost of *lining* a tank with Fligid is *negligible* compared to the cost of *replacing* the tank.

The exposed face of *Fligid* is unplasticized PVC, able to resist the widest range of corrosives, at temperatures to 190 F in many solutions. There's no plasticizer to leach out and contaminate reagents. And this outer face is harder and more abrasion resistant than any other lining material. The inner face is resilient, flexible PVC, easily applied to steel, wood, or concrete, by simple adhesive bonding techniques with no curing. Qualified Kaykor applicators across the United States and Canada give fast, professional service applying *Fligid* to any size or shape structure in the field or in the shop.

GET THE FACTS! Write now for the complete story, including all technical data, in the just published technical sheet "Fligid"... free on request to Kaykor Industries, Inc., 4401 Broad Street, Yardville, New Jersey.

KAYKOR INDUSTRIES, INC.
Division of Kaye-Tex Manufacturing Corp.
YARDVILLE, NEW JERSEY

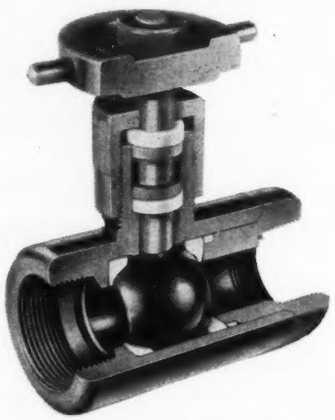
When inquiring check 2772 opposite last page

All-PVC ball valve handles corrosives, is leaktight . . .

construction of unit permits use in plastic or metal systems

Uses: Handling corrosives or other difficult fluids.

Features: Valves are constructed of unplasticized polyvinyl chloride. Unit is corrosion resistant, can be used up to 150 psi at ambient temperatures and 50 psi at 130°F. Sturdy construction permits use in many plastic or metal piping systems for either vacuum or pressure service.

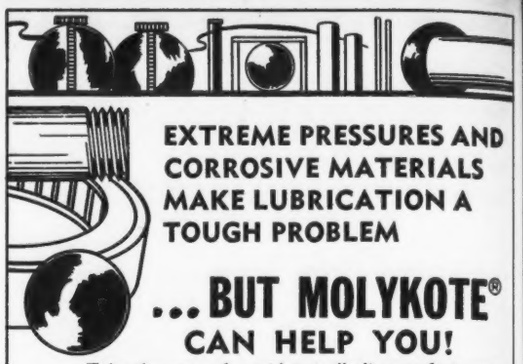


All-PVC valve can be used at 150 psi

Description: PVC valve can be supplied with air operator for remote control and sequence operations. Sizes ½ to 2" in screwed ends are available. Sizes ½ to 2" and 3 and 4" will be available shortly in flange and weld ends.

(PVC ball valve is a product of Jamesbury Corp., Dept. CP, 62 Millbrook St., Worcester 5, Mass. . . . or for more information check 2773 on form opposite last page.)

Your guide . . . to more corrosion control ideas and materials is the alphabetical product directory beginning on page 257 in this issue.



EXTREME PRESSURES AND CORROSIVE MATERIALS MAKE LUBRICATION A TOUGH PROBLEM

...BUT MOLYKOTE® CAN HELP YOU!

Take the case of a midwest alkali manufacturer: In drying bicarbonate of soda, several kilns were used in which 24" diameter chilled cast iron bearings supported a 24" steel shaft. These bearings rotate slowly carrying a weight of 40,000 pounds. The bearings wore rapidly. The temperature varied from 400° to 500°F and this caused the lubricating grease to melt resulting in product spoilage. A problem? It certainly was! Now . . . the bearings are given 4 coats of MOLYKOTE M-88, dry film lubricant, and this is the only lubricant applied. Inspection at 4-month intervals shows negligible wear. Product spoilage is eliminated.

This is only one of many interesting case histories in our Field Report File. If you have a lubrication problem, send right away for Field Report 2, covering the CHEMICAL industry.

THE ALPHA MOLYKOTE CORP.
Main Factories: 65 Harvard Avenue, Stamford, Conn.
759 **71 Arnulfstrasse, Munich 19, Germany**

When inquiring check 2774 opposite last page

BETTER PROTECTION FROM CORROSION CAUSED BY • ACIDS • CAUSTICS • MOISTURE • ALKALIES • SALT SPRAY • WATER • WEATHER ELEMENTS

KERPON
PROTECTIVE COATINGS

Formulated of the sensationally successful EPOXY RESINS

PROVEN SUPERIOR performance in actual use under most extreme corrosion conditions — as container and pipe linings — as product and equipment finishes.

PROVEN SUPERIOR in resistance to practically all natural and chemical corroding elements including many acids.

PROVEN SUPERIOR in flexibility, color and gloss retention, long life and positive adhesion to most metals including iron and steel.

PROVEN SUPERIOR in reducing costly deterioration, replacement maintenance and customer complaints.

For a faster, low cost solution to YOUR corrosion problems write —

KERR CHEMICALS, INC.
BOX 89-P PARK RIDGE, ILLINOIS

• INTERIOR OR EXTERIOR •

When inquiring check 2775 opposite last page

Pure titanium powder available for powder metallurgy . . .

permits corrosion- and erosion-resistant parts to be made

Uses: For making corrosion- and erosion-resistant parts of titanium for a variety of applications.

Features: Titanium powder is of high purity with a quite low oxygen content. Tests have shown the material to have only 0.034% oxygen. Stability of the powder in air is high. This permits powder to be shipped dry and handled with only ordinary precautions.

Description: Titanium powder consists of soft, sponge-like particles of the metal. Although principal application is for making parts by powder metallurgy, material also has a number of other important uses. Suggested applications are the use of material as an ingredient in abrasive wheels and cutting tools, for titanizing, as a chemical reagent, and as a pigment in acid-resistant paints.

(Titanium powder is product of United International Research, Inc., Dept. CP, 38-15 30th Street, Long Island City 1, N.Y. . . . or for more information check 2776 on form which is located opposite last page.)

"I don't care what reducing system it's just like! Get off that vibrating conveyor!"

Idea by R. E. Gunnerson, Brogdex Corporation, Pomona, California.

At a large refinery in the South, highly peptized iron rust created a serious fouling problem in gasoline filters. Here is how company took steps to . . .

arrest rusting of blending tank with corrosion inhibitor

Problem: Filters were continually fouling on gasoline blending tank at a large Southern refinery. Cause of the fouling was a highly peptized iron rust which formed rapidly on tank walls, was removed by even slight agitation, and dispersed in gasoline-water interface.

To prevent gum formation, decomposition reactions, and catalyze sweetening of one of the gasolines going into blending tank, company added a phenylene diamine oxidation inhibitor. Temperature of gasoline was slightly elevated to accelerate sweetening reaction and air added since oxidation of mercaptans is part of sweetening process. Air was bled into rundown line and thereby found its way into blending tank. Mixture of air, at slightly elevated temperatures, gasoline, and water caused filter-fouling rust formation.

Solution: In November 1953 company began treating gasoline in rundown line with Unicor corrosion inhibitor. Material was added at a dosage of about four to five lb per 1000 barrels of gasoline. To test effectiveness of treatment, a square yard or so of interior tank wall was sand blasted to bare metal. Observations of test panel were made at intervals.

Unicor inhibitor forms a water-repellent film on metal surface of pipe or tank. Film-forming properties are due to its amine functionality. It is a strongly polar compound, contains no metals, is completely combustible, and ashless. Molecular weight is somewhat in excess of 800 and gross nitrogen content about 0.7%. High mw and low N content make it acceptable for use in platinum catalytic reformers. Inhibitor has military approval for use in jet fuels grade JP-3, -4, and -5, and also automotive combat gasoline.

Physical properties

°API @ 60°F	29.4
Density @ 60°F lb/gal	7.323
Flash pt °F (P.M.)	118
Pour pt °F	−5
Visc @ 100°F (Univ.) sec	481

Results: Observation of test panel on tank wall indicated that inhibitor was giving complete protection for bare metal.

After five months of satisfactory performance in protecting blending tank, injection points for inhibitor were added further back in production process. Injection was made in crude fractionator overhead and in catalytic gasoline from main column overhead receiver. Protection was thereby

extended to heat exchangers, condensers, and towers between new injection points and blending tank. Some changes were made in addition rates at all three injection points until a satisfactory balance was obtained.

Based on results in refinery, company also added inhibitor to a newly reactivated eight-inch transfer pipeline. When first put in service, line was very badly fouled and showed unfavorable roughness factor. As anti-fouling action of additive took effect, roughness factor improved. Section of line, which was removed and examined after a time, was clean, rust free, and uncorroded.

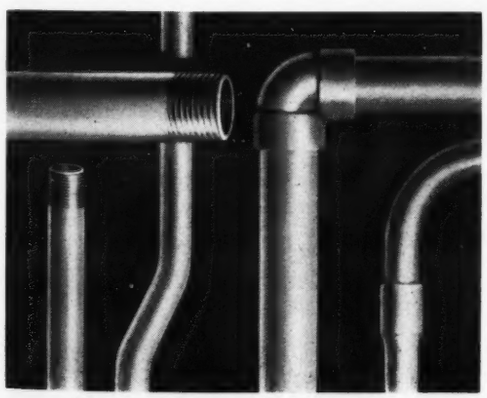
Successful use in petroleum refining suggests that the inhibitor can be used to advantage in a number of operations in chemical plants.

(Unicor corrosion inhibitor and oxidation inhibitor are products of Universal Oil Products Company, Dept. CP, 30 Algonquin Rd., Des Plaines, Ill. . . . or for more information check 2781 on form opposite last page.)

Unplasticized PVC pipe available in sizes from 1/4 to 6" . . .

PVC tube also supplied protects wiring from corrosive fumes

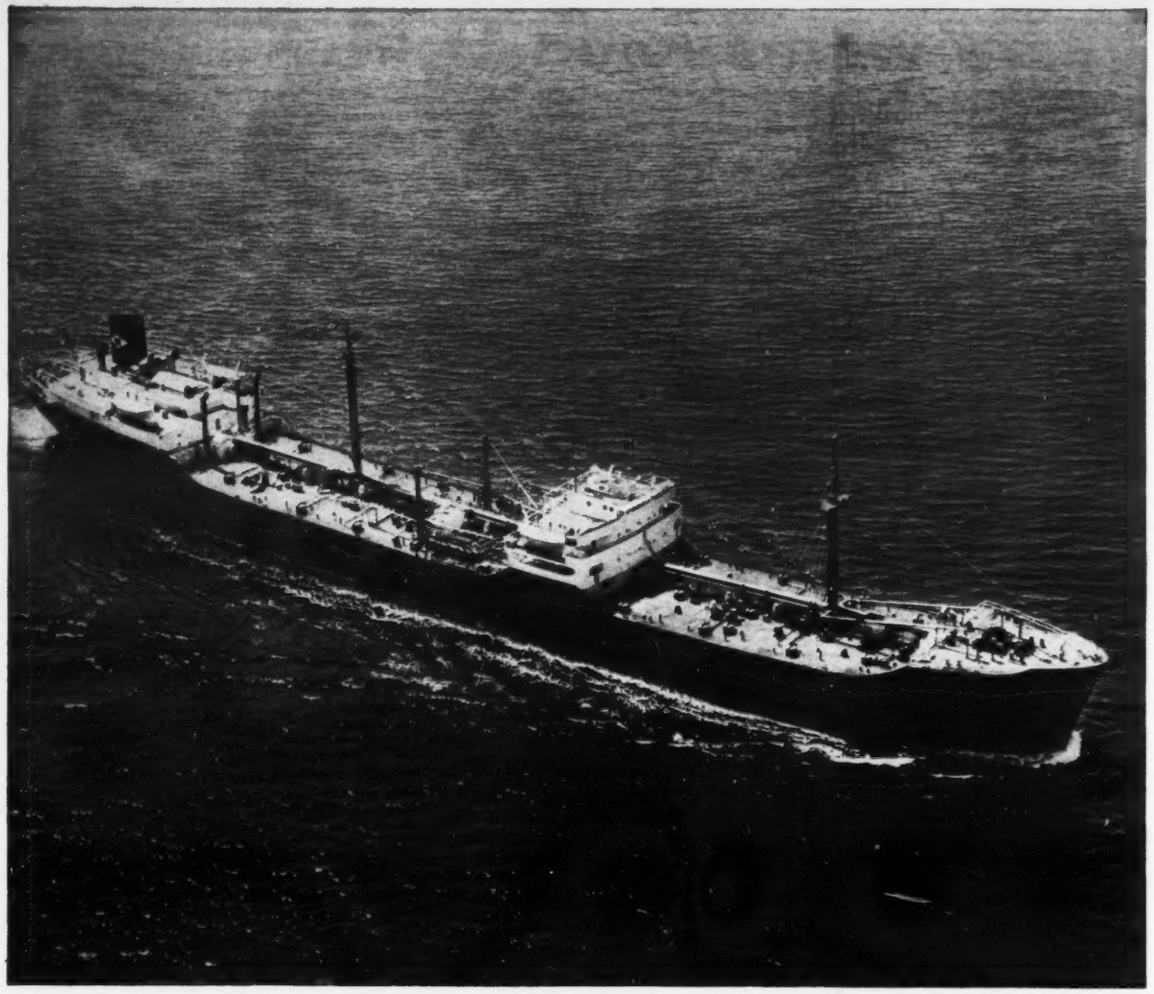
Unplasticized PVC pipe, which is solving an increasing number of difficult problems in the chemical processing industries, can be obtained from manufacturer in all standard pipe sizes from 1/4 to 6". Pipe has high structural strength and a



PVC pipe comes in a wide variety of sizes

tensile strength of 5500 to 7000 psi. PVC tubing, also available, can be used to protect electrical wiring from attack by corrosives.

(PVC pipe and tubing are products of Easton Plastic Products Co., Inc., Dept. CP, Easton, Pa. Check 2782 opposite last page.)



Fume recovery cost lowered by epoxy resin impellers on extrusion machines . . .

plastic units have served for over two years, former units lasted only two weeks

Cost of recovering fumes during extrusion of acetate, viscose, and similar products has been lowered by replacing metallic impellers with units cast from an epoxy resin. Impellers formerly used completely disintegrated in two weeks in some cases. Epoxy-resin units have ben in use in extrusion machines at 450°F for as long as two years with no sign of deterioration. Impellers recover fumes given off during extrusion for re-use.

Epoxy impellers have over 12 times service life of former units

Epoxy resin formulation used for impellers, Pox-Y-Lite, is superior in resistance to organic acids, dilute mineral acids, caustics, alkalis, and most solvents. Cast impellers have a high tensile, impact, and flexural strength. While normally supplied in a dark straw color, material is available at a light transmission of nearly 90%. Company will supply either cast impellers or other products to customers' design, or supply raw materials for castings.

(Pox-Y-Lite epoxy casting resin is a product of The Homalite Corp., Dept. CP, 11-13 Brookside Dr., Wilmington 4, Del. . . . or for more information check 2785 on form opposite last page.)

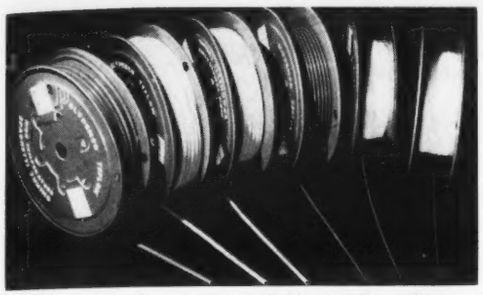
Offer Teflon insulation sleeving for high-temperature service in new sizes . . .

thin-wall tubing now available in AWG wire sizes 0 through 26, and 28 and 30

Uses: Low and high frequency sleeving for electronic components.

Features: Thin-wall Teflon spaghetti tubing has a temperature service range of −320 to +555°F. It is now offered in AWG wire sizes of 0 through 26, and also 28 and 30.

Description: Tubing has a minimum dielectric strength of 750 volts/mil; a dielectric constant of 2.0; surface resistivity above 10^{12} ohms/sq cm. Water absorption is zero. All sizes are available



Wider range of sizes now available in Teflon tubing means more applications are possible

in ten coded colors for circuit identification.

(Polypenco Teflon spaghetti tubing is available from The Polymer Corp. of Pennsylvania, subsidiary of The Polymer Corp., Dept. CP, 2140 Fairmont Ave., Reading, Pa. . . . or for more information check 2786 on form opposite last page.)

Corrosion inhibitor for tanks and equipment handling liquid fertilizers . . .

chemical material forms tough, protective film on metal surfaces

Uses: For corrosion control applications involving ammonia liquors. Corrosion is controlled in pipe lines, storage tanks, tank cars, and equipment handling liquid fertilizer solutions.

Features: Inhibitor cuts corrosion losses by forming a tough, corrosion-resistant protective film on metal surfaces.

Description: Nalco 889 is a blend of organic and inorganic corrosion inhibitors. Low dosages of from 100 to 500 ppm are sufficient to inhibit corrosion. No special precautions are needed in handling the material. It should be stored in a non-humid area.

(Nalco 889 corrosion inhibitor is product of National Aluminate Corp., Dept. CP, 6294 W. 66th Pl., Chicago 38, Ill. . . . or for more information check 2787 on form opposite last page.)

Lists properties of Teflon

Bulletin of four pages presents chemical, mechanical, thermal, electrical, and other properties of Teflon. Manufacturer's Teflon pipe, rod, tube, sheet, and other products are illustrated, and available sizes are indicated.

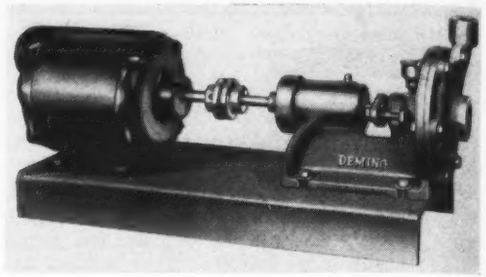
Bul T-50 is issued by Haveg Industries, Inc., Dept. CP, 950 Greenbank Rd., Wilmington 8, Del. Specify 2788 opposite last page.

CORROSION CONTROL

Rubber-lined centrifugal pump designed for non-oxidizing acids and solvents

Uses: For handling non-oxidizing acids and solvents detrimental to standard pumps.

Features: Pump can handle a wide variety of corrosives without deterioration of unit's liquid end parts.



For aggressive corrosives

Description: Rubber-lined side-suction centrifugal pump is available in capacities up to 40 gpm. Special design of unit includes a rubber impeller and stainless steel shaft. Pump is available as a motor-driven or a belt-driven unit.

(Rubber-lined centrifugal pump is product of The Deming Company, Dept. CP, Salem, Ohio . . . or for more information check 2791 opp. last page.)

Cartoon by J. W. Hambleton, Devoe & Raynolds Co., Inc., Alhambra, Calif.

Aluminum pipe line installed without external protection in Texas . . .

corrosion resistance of aluminum expected to provide low-cost service

Installation of a major aluminum, gas-carrying pipe line that resists corrosion without external protection was completed recently in Texas. Eight inches in diameter and four miles in length, the line services Alcoa's Point Comfort, Texas, operations.

The schedule 40 pipe is buried in soil ranging from sand and gumbo to salty marsh. Devoid of protective coatings and anodes, the aluminum line is shielded only by electrical insulation at certain flanged joints. Anodes will be installed on test sections, however, to provide a detailed study of their effectiveness.

Aluminum pipe runs through soil ranging from sand and gumbo to salty marsh

Corrosion resistance of aluminum pipe is expected to deliver low-cost service. Gas flows through the pipe line at a pressure just under 500 psi. Line has been tested at 800 psi.

(Aluminum pipe is product of Aluminum Company of America, Dept. CP, 1501 Alcoa Building, Pittsburgh 19, Pa. . . . or for more information check 2792 on the convenient Reader Service slip opposite last page.)

Stainless steel fasteners — condensed stock list

Thirty-seven basic stainless steel fasteners are illustrated and detailed in eight-page condensed stock list. Screws, bolts, nuts, washers, rivets, pins, and "AN" specification fasteners are included. Data on sizes, styles, and grades of stainless steels are listed.

Condensed stock list is issued by Allmetal Screw Products Co., Inc., Dept. CP, 821 Stewart Ave., Garden City, Long Island, N.Y. When inquiring specify 2793 on form opposite last page.

Ohio State University develops new cast alloy . . .

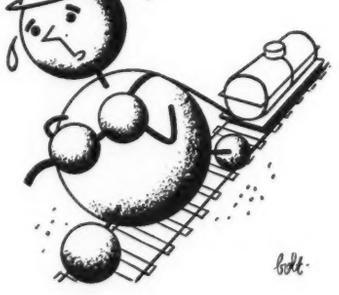
has excellent corrosion resistance with good mechanical properties

Dr. M. G. Fontana, Chairman, Department of Metallurgical Engineering, Ohio State University, recently announced a new cast alloy which was developed in the University's Corrosion Research Laboratories. The high-strength cast alloy meets the need for a corrosion-resistant metal with better mechanical properties than the usual 18-8 stainless steels. Designated as type CD-4MCu, alloy has following composition:

Cr	25-27%
Ni	4.75-6.00%
C	0.04% max
Mo	1.75-2.25%
Cu	2.75-3.25%
Si	1% max
Mn	1% max

According to Dr. Fontana, not only is the corrosion rate of the alloy very low in boiling nitric acid, but there is no tendency for the corrosion rate to increase with time. New alloy showed no corrosion at room temperature in 10% sulfuric acid, 50% sulfuric, or 0.5% hydrochloric acid.

(For further information on CD-4MCu alloy contact Alloy Casting Institute, Dept. CP, 286 Old Country Road, Mineola, N. Y. . . . or check 2796 on form opposite last page.)



NEW CHEMICALS BY THE CARLOAD

About 625 chemical products introduced during 1956 are listed, described, and indexed in this month's special report — it starts on page 43.

Polyvinyl chloride tank lining available in two thicknesses . . .

laminate has excellent corrosion resistance

Uses: For the protection of tanks, vessels, and other process equipment against corrosion.

Features: Lining is now available in two standard thicknesses. Recently introduced type is 0.055" thick. Original material is still available in a thickness of 0.085".

Description: Lining is a continuous laminate of unplasticized polyvinyl chloride on one face and plasticized polyvinyl chloride on the other. Thus, the desirable strength and corrosion resistance of the unplasticized material is combined with the ability of the plasticized PVC to be bonded to such structural materials as steel, concrete, and wood. Laminate does not require curing.

(Fligid plastic linings are product of Kaykor Industries, Inc., Dept. CP, Yardville, N.J. . . . or for more information check 2797 opp. last page.)

Titanium-containing nickel alloy has good oxidation resistance at temperatures to 1600°F . . .

alloy similar in composition to Incoloy

Uses: Although alloy was developed primarily for use in jet engines, it should have some other interesting applications where resistance to high temperatures is required.

Features: Alloy has excellent oxidation resistance at temperatures up to 1600°F.

Description: Incoloy T titanium-containing nickel alloy is similar in composition to Incoloy and contains in addition about 1% titanium.

(Incoloy T alloy is product of The International Nickel Company, Inc., Dept. CP, 67 Wall Street, New York 5, N.Y. . . . or for more information check 2798 on form opposite last page.)

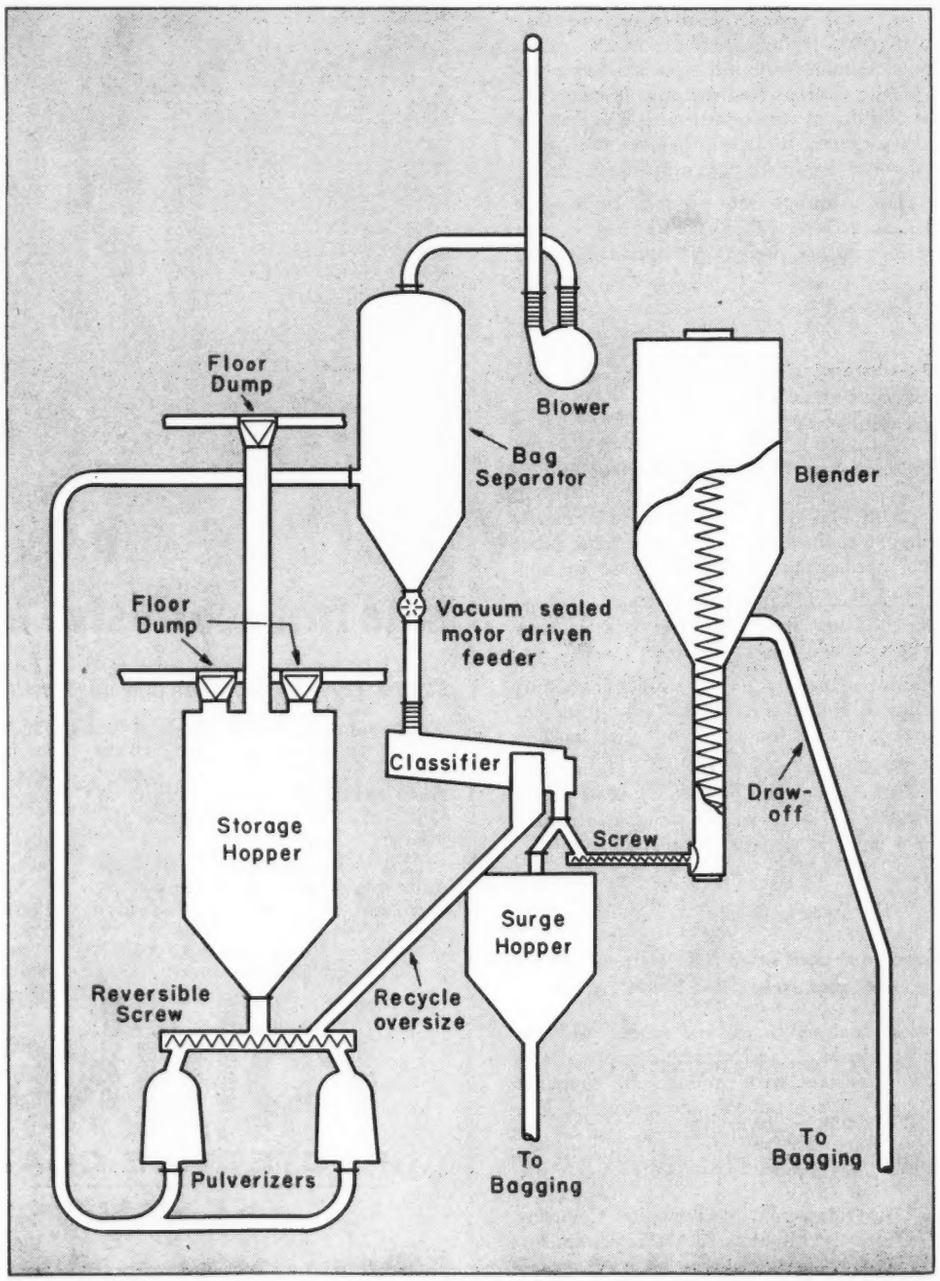
Data handbook and price list for wire, rod, and strip

Chemical analysis charts and tables, and mechanical, electrical, and magnetic properties of corrosion-resistant wire products are contained in 28-page data handbook and price list. Production and design information and weight charts for wire, rod, strip, and flat wire are included.

Price List 11 is issued by Techalloy Company, Inc., Dept. CP, Rahns, Pa. When inquiring specify 2799 on form opposite last page.

Negative pressure in pneumatic conveying system keeps plant atmosphere free of dust and contamination and . . .

allows flexibility in pro



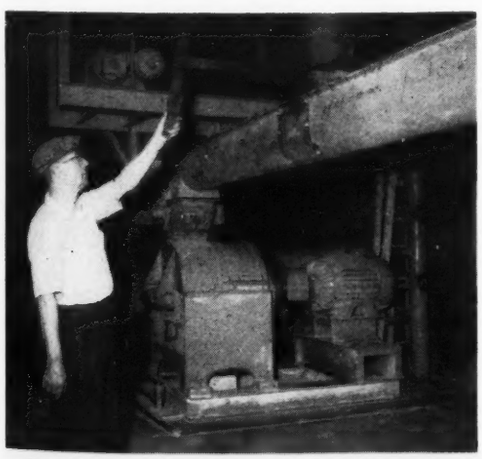
y in product routing

When the decision was made by Armour & Company to modernize its animal glue grinding, blending and bagging operations, one of the major problems to be faced was that of handling the finely ground material between four processing floors, routing it to different processing equipment, as required for the type of material to be produced. Not only was a flexible material handling system required for this job, but also one which would be inherently self-cleaning in order to keep to a minimum the possibility of mixing different grades of material. The system finally designed was a pneumatic conveying system operating under vacuum, arranged so no material could possibly escape into plant atmosphere.

From its final drying stage, the adhesive enters the processing system through three floor dumps, two on the third floor and one on the fourth floor. Material is then held in a storage hopper to be fed to the grinding units. Material is fed by a reversible screw to either of two pulverizers.

Both pulverizers, which are located on the first floor, discharge ground material through the floor into the basement area where product is caught in material intake valves and drawn into the vacuum conveying system. The ground product is conveyed up through a 6-inch diameter pipe to the collector

(*Please turn to page* 152)



Gate valve controls flow of material from hopper into screw conveyor which, in turn, feeds into pulverizer

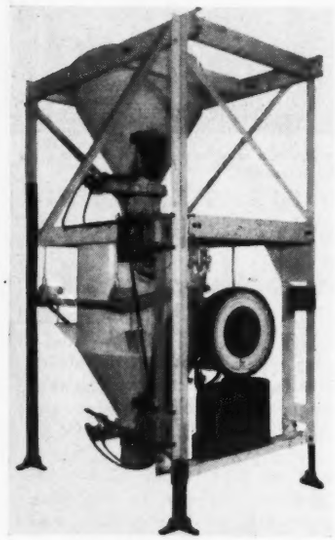
Provides remotely printed and totaled net weights of granular materials . . .

material left in hopper is automatically subtracted

Uses: Weighs granular materials at rates to 50,000 lb/hr with individual drafts of material weighing 1000 lb each.

Features: Only actual net weight discharged is added to cumulative total, and any amount sticking to hopper is automatically compensated.

Description: Basic unit is suspension-type scale on which a weigh hopper is mounted. Surge hopper receives material and dumps it into weigh hopper. Both



Printed and totalized net weight records of bulk material are provided by scale's automatic system

hoppers are equipped with pneumatically-operated discharge gates. Scale indicating mechanism is equipped with cutoff device to stop flow of material from surge hopper into weigh hopper at preset cutoff position.

Direct digital electro-mechanical converter transforms weights into electrical signals which are transmitted to an electric adding machine. Adding machine may be remotely located at most convenient operating point.

An operating station that can be mounted near scale or in remote office area is also included. It contains switches, pilot lights for controlling system, and predetermined counter for setting number of drafts to be delivered.

(Bulk weighing scale with automatically totaled net weights is product of Toledo Scale Co., Dept. CP, 1104 Telegraph Road, Toledo 1, Ohio . . . or for more information check 2803 on form opposite last page.)

Illustrates, gives data on line of feeders

Four-page bulletin pictures and presents specification data on line of feeders, line slakers and proportioning pumps. Typical control panels are shown. Described installations show how two or more liquids and/or solids are fed into continuous processes.

Bul 10-N1 is issued by Omega Machine Co., Div. of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence, R. I. When inquiring specify 2804 on form which is located opposite last page.

Lists skid, pallet trucks, and gravity conveyors

Four-page, two-color catalog gives specifications, drawings, and descriptions of line of hand-operated pallet and skid lift trucks. Skate-wheel conveyor sections, as well as series of guard rails and stands, are also listed.

Cat HM-56 is issued by The American Pulley Co., Dept. CP, 4200 Wissahickon Ave., Philadelphia 29, Pa. When inquiring specify 2805 on form opposite last page.

For more information on product at left, specify 2806 . . . see information request blank opposite last page.

Pneumatic Conveying System

(*Continued from page* 149)

which is located between the third and fourth floors, where the material is separated from conveying air. The product-free air is drawn out of the collector into the vacuum producer and discharged to outside atmosphere.

Material discharged from the collector through a motor-operated rotary valve is fed to one of two ROTEX classifier units. Fines from these classifiers are routed on to bagging or further processing while oversize particles are recycled into the system ahead of the pulverizer. Screw which feeds the pulverizers automatically feeds oversize material into the correct mill.

After classification, material drops by gravity into a storage bin for bagging, or to one of two vertical blendors. After the proper blending has been accomplished, material is drawn off for final bagging. Key, of course, to this operation is the pneumatic conveying system, operating under negative pressure. It eliminates loss of material, which makes for more economical production and, of course, for better plant working conditions.

The vacuum producer is a multi-stage centrifugal-type unit employing cast aluminum impellers which rotate within a sectional cast iron housing. Vacuum producer is directly connected to a 20-hp, 3600-rpm motor.

The dust collector is sixty inches in diameter and one hundred and twenty inches on the vertical sheet, with a conical hopper bottom equipped with a motor operated rotary discharge valve. Collector houses fifty inverted filter bags which provide an effective filtration area of 586 square feet. Filter bags are inverted and do not fill with material. Bags are supported by a spring-suspended spider connected to a motor-driven bag shaking mechanism for periodic bag cleaning. Material is introduced into the collector through a six inch opening located under the bag plate of the collector. By means of an internal cone, a centrifugal separation is provided before the dust rises into the filter bags and thus the actual dust loading on the filter bags is held to a minimum.

The advantages of the pneumatic conveying system are flexibility, cleanliness, ease of installation, and lower initial costs, plus the dollar savings made possible by a really tight means of material handling.

Pneumatic conveying system was engineered by U.S. Hoffman Machinery Corp., Dept. CP, 105 Fourth St., New York 3, N.Y. . . . or for more information check 2808 on form opposite last page.

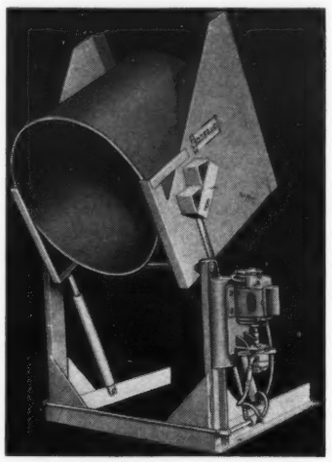
The alphabetical Product Directory (starting on page 257) will give you a page reference to all articles and advertisements in this issue

Hydraulic dumper handles loads to 2000 lb . . .

unit operates on either 12-volt battery or standard AC line

Uses: Dumping drums, vat boxes, box trucks, and specially shaped containers.

Features: Unit is stated as being mobile for use anywhere in plant. Its electric motor operates on 12-volt battery or conventional AC.



Hydraulic dumper will elevate 2000-lb loads to height of 60"

Description: Dumper has two cylinders for hydraulic operation. It will elevate loads to 2000 lb at heights up to 60".

(Tubar dumpers are manufactured by Uhrden, Inc., Dept. CP, P.O. Box 193, Dennison, Ohio. Check 2813 opposite last page.)

Bulletin on fork truck has specs, drawings

Specifications and drawings of gasoline-powered electric-driven fork truck are given in four-page, two-color bulletin. Truck has load capacity of 10,000 lb with load length of 48 inches.

Bul 6007A is issued by Automatic Transportation Co., Dept. CP, 149 W. 87th St., Chicago 20, Ill. When inquiring specify 2813A opposite last page.

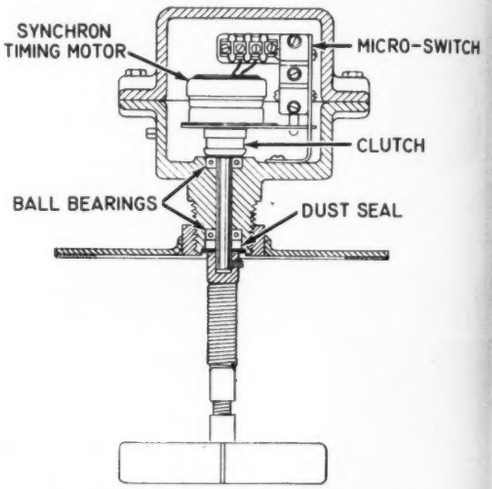
MATERIAL HANDLING

Indicates bin level in dangerous atmospheres . . .

has UL label for use in Class I, Groups C and D, Class II, Groups E, F & G

Uses: Unit is designed to indicate or control level of any flowable bulk material in bins or hoppers.

Features: Indicator has explosion-proof housing, is listed by Underwriters' Laboratories for use in hazardous atmospheres, Class I, Groups C and D, and Class II, Groups E, F & G. Included are: vapors of ethyl ether, gasoline, petroleum, alcohol, acetone, lacquer solvent, natural gas and atmospheres charged with carbon black, coal or coke dust.



Explosion-proof housing has Underwriters' Lab listing for operation in hazardous atmospheres

Description: A low torque motor, located in explosion-proof housing, rotates paddle at slow speed. Material building up to indicator stops rotating paddle and stalls the motor. As motor stalls, torque of motor actuates a micro switch — controlling signal lights, horns, conveyor motors or feeding machinery.

Unit also can indicate receding level. Material in bin prevents paddle from moving. As receding material releases paddle, rotation actuates switch for signals or machinery.

(Roto-Bin-Dicator is available from The Bin-Dicator Company, Dept. CP, 13946-43 Kercheval, Detroit 15, Mich. Check 2817 opposite last page.)

For more information on product advertised at right, specify 2818 . . . see information request blank opposite last page.

Stop engine! Hood up! Start Savings!

You'll be setting no record with the all-new *Clarklift* if only ten seconds elapse from the time it rolls to a stop and a service man goes to work on the engine. If it's magic, there's only one trick—the whole hood swings back, seat and all, and in *much* less than *ten* seconds, too. All engine components are immediately accessible. Your service man can go right to work. And *reversing* the procedure is as simple as closing your automobile hood.

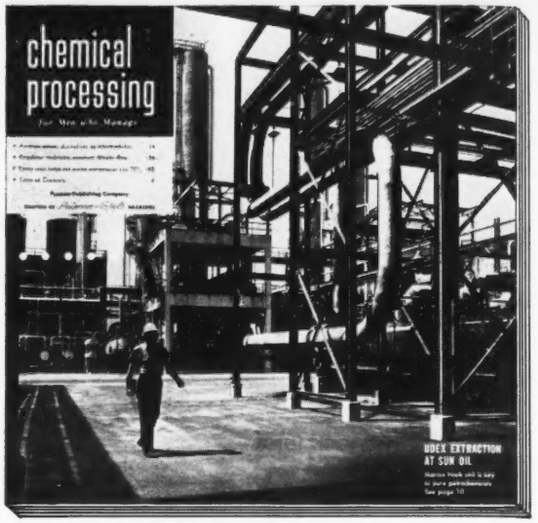
There are no bolts, no screws, no metal plates. All this saves valuable hours every month *usually* wasted *in just getting ready* to service the average truck. You know your service-hour rates better than we do, so you figure the savings. Then let's get together to prove it.

Industrial Truck Division
Clark Equipment Company
Battle Creek, Michigan

CLARK® EQUIPMENT

Can you "pay for" a magazine like this?

with a $3.00 or $5.00 subscription?



This magazine costs more than $40.00 per year

Maybe you've thought publishers make money on a $3.00 or a $5.00 subscription . . . that that is why they ask you to subscribe.

No, it's not true . . . your $3.00 or $5.00 fall far short of "paying" for *any* really good business magazine.

The costs of printing, paper and postage alone usually exceed subscription prices. Editorial costs and other expenses run to many times that amount. And usually it costs more just to sell such subscriptions than they bring the publisher in dollars. So, the publisher actually "loses money" on such sales.

Then, why? . . . yes, *why* do some publishers charge a nominal rate for a subscription . . . but other publishers send their magazines without charge?

Well. the "paid-subscription" magazine gets a lower postage rate than does the "non-paid subscription" magazine. Some publishers feel this postal advantage is important. So they charge a "token fee" as a subscription price. And so win a lower postage rate.

But—whether you pay nothing, or such a "token fee," you — the reader — do not *really pay* for the magazine's service.

No — advertisers pay the bills . . . and so, logically, advertisers *demand* the best possible coverage of the important, key men of the field. That means folks like you, who exercise buying power.

CHEMICAL PROCESSING "hand-picks" its readers—for best, effective circulation . . . and sends the magazine to these key folks, without charge.

You see, you simply can't get maximum coverage of important folks by trying to force them to buy subscriptions. Such men, limited in numbers, are scattered all over the U.S.A.; travel and/or direct mail, cost money; a large share "forget to renew" each year; and, no matter how much time, money and pressure you put on them, there are always some important men who will never buy.

You don't "pay"—CHEMICAL PROCESSING gets better circulation. So, as you can see, a subscription price is at best but a "token payment." You don't really pay for any magazine with $3.00 or $5.00.

But, CHEMICAL PROCESSING gets the best, most effective circulation coverage by "hand-picking" the right readers. This gives values to advertisers which they can't possibly get in any other way.

That's why . . . CHEMICAL PROCESSING hand-picks only qualified readers . . . Men Who Manage chemical processing plants . . . presidents, partners, plant managers, foremen, engineers, chemists, directors of research, etc. Then the editors make the magazine so interesting, so valuable, these folks want to read it.*

That's why CHEMICAL PROCESSING spends many thousands of dollars on each issue — to give you this service costing more than $40.00 per year . . . without charge . . . as *you* are an important reader in the chemical field.

No, you can't "pay for" any good business magazine with $3.00 or $5.00. Whether you receive a "paid magazine" or a "non-paid magazine" you are still enjoying a valuable service — whose cost is far above any price you paid for a subscription.

**Every issue proves this qualified readership . . . by unequalled response from these key readers. May we show you the evidence?*

Chemical Processing

PUTMAN PUBLISHING

published by: Putman Publishing Company

also publishers of:
FOOD PROCESSING
INDUSTRY POWER
FOOD BUSINESS

EPA
NBP

"Executive Magazines for Industry"

What is lift-truck accessibility?

You'll find a whole new definition of lift truck accessibility in these *facts* about the new *Clarklift:* the hood swings back in seconds revealing every part of the engine for routine maintenance; the counterweight hangs on hooks, is held in place by a *single* bolt. The *entire* power train is exposed and upright removed in minutes.

Brakes are self-adjusting. Rollers can be adjusted right on the upright without disassembly. One multiple plug disconnects the *entire* electrical system. Drive axle and brake system units are easily removed. Bearings sealed in wheel hubs eliminates replacement or repacking every time wheel is removed. You can get many more facts by calling your *Clarklift* dealer.

Industrial Truck Division
Clark Equipment Company
Battle Creek 9, Michigan

CLARK® EQUIPMENT

Manually operated dispenser attaches to containers of lubricants . . .

complete unit affords portable means for lubricating gears

Uses: Attaches simply to original refinery lubricant container

Dispensing unit fits any standard 25-lb to 50-lb original refinery lubricant container

for fast, clean refilling of transmissions, differentials, gear cases, final drives, other components.

Features. Clamping to standard 25-lb to 50-lb containers, apparatus gives a portable, manual method of dispensing lubricant.

Description: Constructed of steel and finished in baked blue enamel, unit consists of cover plate, plunger arrangement, and five-foot hose assembly. Lubricant output is one pint per ten strokes. Developing 400-lb maximum pressure, dispenser is reported as assuring positive prime in handling heaviest lubricants in any weather.

(Lubricant dispenser is manufactured by Lincoln Engineering Co., Dept. CP, 5780 Natural Bridge Ave., St. Louis 20, Mo. Check 2819 opposite last page.)

For more information on product at left, specify 2820 . . . see information request blank opposite last page.

Light weight, easy handling impressed operating personnel. And — long life and low replacement rate of . . .

PLASTIC TRAYS SAVE $8

— are suitable for materials with pH under eight

Problem: In manufacturing dye intermediates, pigments, and corrosive chemicals, American Cyanamid Company at Boundbrook, N.J., and Willow Island, W. Va., found enameled steel trays were fragile, required special handling. Ordinary rough-and-tumble use in manufacturing operations could easily cause chipping and flaking of the finish. Often glass chips and rust on exposed metal surfaces threatened to contaminate final products.

Disposal of chipped and flaked trays was frequently necessary, although trays could sometimes be transferred to other uses not requiring freedom from rust. But replacement costs of steel trays were running approximately $16,000 annually.

Solution: Beginning in 1954, Cyanamid's two plants began using experimentally 1000 molded plastic standard dryer trays. Made of molded glass fiber and reinforced polyester resins, the trays are further reinforced with basic wire embedded into all four sides.

Trays were originally distributed for evaluation in several production departments which had been using enameled steel trays. Trial period lasted two years. Several hundred additional trays were ordered once the trial period was over.

Trays are used to handle acid corrosive chemical intermediates (pH under 8). Materials are shoveled onto the tray and

(*Please turn to page* 158)

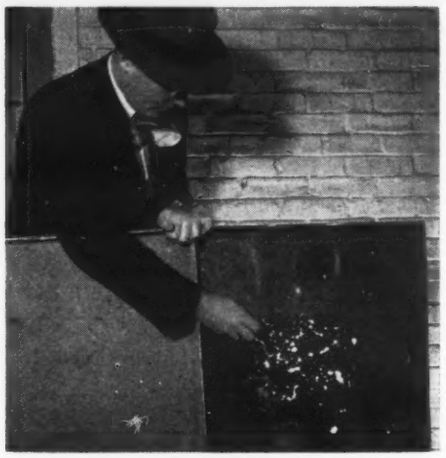
Operator leveling corrosive chemical intermediates in molded plastic trays at American Cyanamid Company's plant in Boundbrook, New Jersey

VE $8000 YEARLY

In loading corrosive chemical intermediate, operator can not chip plastic tray

Molded Glass Fiber Trays

(*Continued from page 156*)



Examining holes formed in metal drying tray, at right, by corrosive chemical intermediates. Molded plastic tray, at left, is unaffected

then smoothed out by hand. Loaded trays can be placed onto standard drying racks for movement into drying ovens. Tray unloading requires only dumping into a receiving bin.

Glass fiber, resin-reinforced trays resist non-oxidizing acids, corrosive salts, weak alkalis, and many other chemicals. Trays are lighter than aluminum, do not chip, and — naturally — do not rust. Trays do not bend, dent, or warp, and have a smooth, non-porous surface, free of any coating. Materials of the tray do not contaminate materials being processed.

On a strength-weight basis, molded glass fiber trays are stronger than steel and can stand rough handling because of high impact strength. If damaged, trays are easily repaired and returned to service. Price of the plastic tray is competitive with that of metal trays of same size and shape.

Results: American Cyanamid estimates that approximately $16,000 a year were being spent in replacement purchases of metal trays at the two plants. Use of glass fiber and polyester resin trays reduced tray replacement costs to approximately $8000 a year. Operating personnel are impressed with the light weight and easy handling.

Also, more and more uses are being found for plastic trays. Cyanamid uses them to replace not only trays of enameled steel but also those of steel, stainless steel, Monel, and aluminum.

Now — pharmaceutical shops of American Cyanamid are investigating use of molded fiber glass polyester trays for drying crude drugs.

(Molded glass fiber trays are product of Molded Fiber Glass Tray Company, Dept. CP, Linesville, Pa. Check 2825 on form opposite last page.)

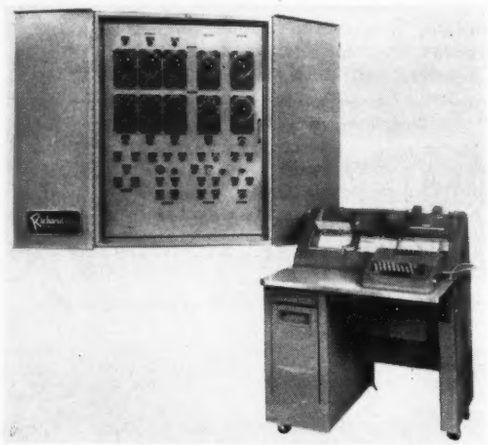
Keeps track of weighings by making records on punch cards . . .

automatic proportioning system is combined with IBM summary punch

Uses: To process billings, maintain inventory control, and keep similar records of weighing and proportioning.

Features: Panel allows records to be kept on summary punch cards which can be processed through an IBM business machine.

Description: Panel is combination of automatic proportioning control system with an IBM summary punch. Information is transmitted by means of digitizing equipment.



This system controls three scales. Weights are recorded on punch cards

System illustrated in photograph controls three scales, with three weight selectors for the first scale, and one each for the second and third. Each of these selectors can be selected "in" or "out". Second group of selectors is also supplied on this panel, so that two formulas can be simultaneously set up and run through proportioning system.

System is fully interlocked with scales and feeders to insure accurate weighings and recordings. Included in set of controls are "over-under" interlocks and standard proportioning interlocks.

Under full-automatic operation a formula is set up on panel's control dials, the system being set to repeat the formula automatically as many times as desired. For semi-automatic operation the operator sets the controls each time a formula is fed into the system.

(Select-O-Weigh system with complete recording feature is product of Richardson Scale Co., Dept. CP, Van Houten Ave., Clifton, N. J. . . or for more information check 2827 opposite last page.)

MATERIAL HANDLING

Lift truck manufacturers go to push-button power lubrication . . .

provides complete high-pressure lubrication of all bearings in two seconds

Six of the largest builders of fork lift trucks have recently adopted a centralized lubrication system. Lubrication of these units by the conventional grease gun method consumes an average of 45 minutes and may not be as reliable as the automatic procedure. System derives its power supply from the engine intake manifold. When control button is pushed, green signal light illuminates in about two seconds, indicating completion of lubrication cycle. In addition to savings in maintenance, it is estimated that service life of trucks is extended from 15-20%.

(Lift-truck manufacturers using centralized lubrication include Clark, Yale & Towne, Automatic Transportation, Towmotor, Mercury, and Allis Chalmers.)

(Centralized lubrication system is product of Lincoln Engineering Co., Dept. CP, 4010 Goodfellow Blvd., St. Louis 20, Mo. . . . or for more information check 2831 on form opposite last page.)

"Which of you is the Polly Etheline my husband is always speaking of?"

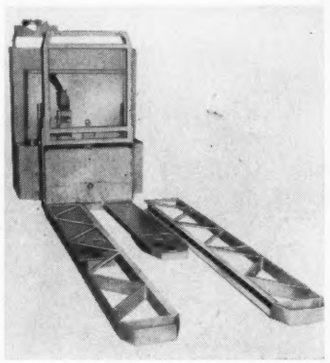
Thanks to Ann Alpaugh, Vulcan-Cincinnati, Inc., Cincinnati, Ohio.

Attaches to forks to double their length . . .

extensions come in many sizes to fit any pallet truck

Uses: Enabling pallet trucks to handle long, light, bulky loads on either skid platforms or open-face pallets.

Features: Attachments slip onto standard forks to double length of the forks.



Fork extensions enable truck to handle oversize pallets

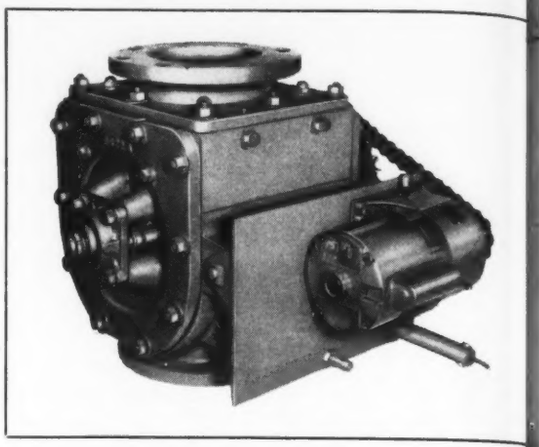
Description: Fork extensions are of reinforced all-steel construction. They are available in wide range of sizes and are adaptable to any pallet truck.

(Removable fork extensions are manufactured by Dept. R-39, Lewis-Shepard Products, Inc., Dept. CP, 125 Walnut St., Watertown, Mass. Check 2836 opposite last page.)

Feeder controls density before metering

Vibratory feeder that accurately meters dry material and controls density is described in four-page bulletin. Units provide flow rates from 1 oz to 100 tons per hr. Table and drawings show dimensions for various models.

Bul on feeder is issued by Vibra Screw, Dept. CP, PO Box 62, Williston Park, N.Y. Specify 2837 opposite last page.



Self-contained unit has gearmotor mounted on side of housing

Controlling discharge of solids from hoppers or overhead bins — that's the job of the rotary feeder. What happens if a large lump should stall its operation? Its rotor will . . .

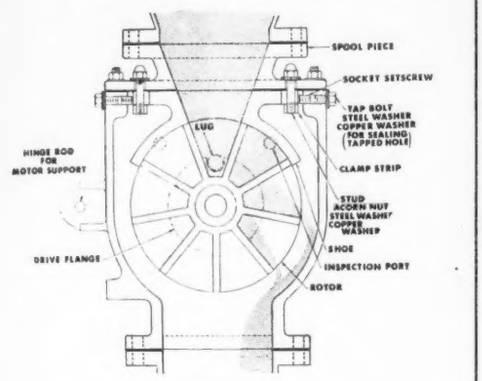
Uses: Rotary feeders control flow of fine or granular, free-flowing, dry, solid materials from overhead storage bins or collecting hoppers. Through them, material is fed consistently onto conveying systems on into containers without fear of flooding.

It is possible to obtain the rotary feeders for use in systems that will be operating under pressure.

Features: Feeder seals against a pressure differential up to 3 psig and regulates quantities with positive cutoff. This seal, formed by contact of shoe and rotor, cannot be broken by large particles that might otherwise lodge, keep feeder open, and cause flooding.

Unit is available with "reversing-drive," *i.e.*, when an obstruction tends to stall the rotor, the motor reverses, and the rotor starts to move in the opposite direction. If obstruction still stalls the rotor, another reversal takes place. The rotor continues to oscillate until obstruction is dislodged or thermal overload stops motor.

Description: Self-contained, factory-assembled feeder flange-attaches to pipe, chute, or hopper-flange. Material falls, by gravity, through opening in spool-piece and shoe into buckets of the moving rotor. Flange on bottom of shoe contacts



Rotary feeder takes gravity-fed bulk material from hopper or storage bin into buckets of moving rotor. As buckets rotate, material is dumped and discharged through outlet at bottom

oscillate to discharge lumps blocking flow of solids

periphery of rotor and spans three buckets.

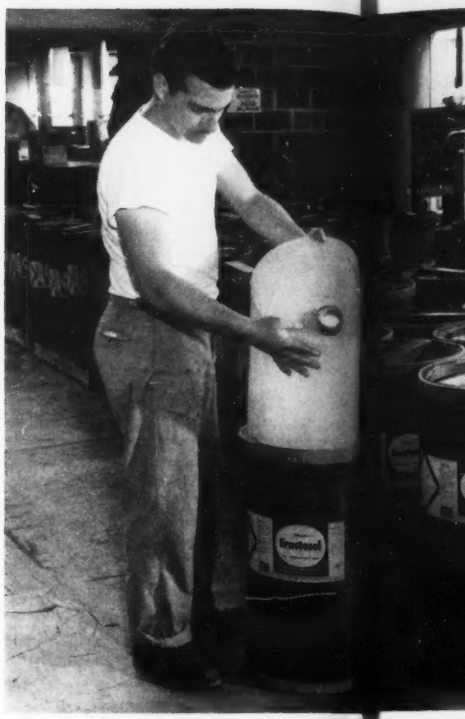
As loaded buckets move away from closure of shoe, material falls unrestricted through space between rotor and housing.

Feeder is driven by sprocket and chain from a gearmotor mounted on side of housing. Both "non-reversing" and "reversing" drives are available at constant or variable speeds. Under "non-reversing" drive, when an obstruction tends to stall the rotor, the motor is automatically stopped. Restarting the motor several times will generally free the obstruction. "Reversing" feeders are equipped with a hydraulic dash pot which dampens the oscillating motion.

Rotary feeders are supplied in five sizes. Table below shows normal motor sizes and capacities based on a speed of 25 rpm:

Inlet & outlet diameter	4"	6"	8"	10"	12"
Rotor capacity — cu in/rev	100	405	700	1065	1725
Motor horsepower	⅓	⅓	⅓	½	½

(Type "B" rotary feeders are manufactured by Allen-Sherman-Hoff Co., Dept. CP, 259 E. Lancaster Ave., Wynnewood, Pa. . . . or for more information check 2840 on Reader Service slip opposite last page.)



Molded polyethylene drums slip into overpack to make simple shipping container assembly

Can you cut your freight costs? Pennsalt — by changing to polyethylene drums for shipping muriatic acid-based cleaners —

cut freight costs by about 40%

ROBERT B. SCHAEFER, Packaging Engineer
Chemical Specialties Division
Pennsalt Chemicals, Philadelphia, Pa.

Problem: In spring of 1952, Pennsalt Chemicals was faced with a packaging problem they felt was acute — the Chemical Specialties Division wanted a shipping container for acid solutions that would have:

- low initial cost
- lower freight rates
- low maintenance costs
- minimum storage space
- increased safety

Polyethylene had been suggested as a material that would produce a drum with these features. But . . . . polyethylene had not been approved for shipping containers by ICC. Customer reaction to the change was also unknown.

Solution: Purchasing and traffic people, as well as engineers, started evaluation of a molded polyethylene drum — with comprehensive long-term storage, handling, shipping, and drop tests. The drums looked good and commercial shipments were started, but . . . suddenly . . . failures began to occur. Long-term

(*Please turn to page* 168)

Composite drums are moved cheaply and safely in large numbers

Drums are safely stacked to increase storage space. Here, 4536 gallons of muriatic acid take up only 96 sq ft of floor space

New polyester film takes heat-seal!

Now you can have all the advantages of packaging in tough polyester film – *plus* heat sealing – with "SCOTCHPAK."

This remarkable polyester film takes a seal as tough as the film itself – and easily: A temperature of 275° to 375°F. and 20-60 psi is all that's required.

"SCOTCHPAK" Brand Heat-Sealable Polyester Film gives you a packaging material with a high degree of inertness and resistance to extreme temperature conditions. It also protects against solvents, chemicals and moisture – yet has high tensile strength.

Here is a versatile packaging film. Manufacturers of such varied products as cosmetics, acids, syrups, silverware, oils, greases, adhesives, asphaltics, catsup, mustard and surgical dressing will find it ideal. It can even be used as a container liner or insulation pillow.

For complete information, write for folder described at right.

TRADEMARK

"SCOTCHPAK"

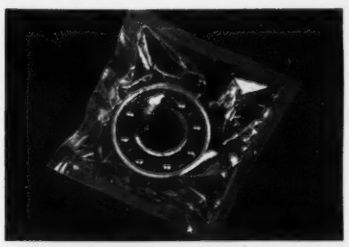
BRAND

HEAT-SEALABLE POLYESTER FILM

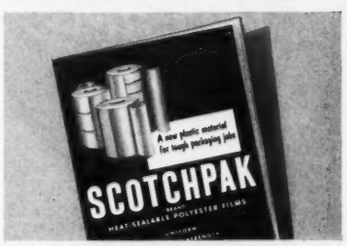
Look what you can do with it!

LIQUIDS, semi-solids, and solids can be packaged easily, handled safely, shipped without fear in heat-sealable containers of new "SCOTCHPAK" Polyester Film.

FOOD ITEMS are packaged safely in clear-as-glass "Scotchpak" Film. Contents can be frozen . . . even boiled *right in the package.* Low gas penetration rate . . . inert and non-toxic.



METAL PARTS can be packaged dry or in oil or grease to protect them against corrosion. Transparent packages are easy to handle, easy to ship and to store. Simplifies issuing of parts and units.



FREE FOLDER shows dozens of ways you can solve your most difficult packaging and shipping problems with new "Scotchpak" Polyester Film. Just write on your letterhead: Film Products Group, 3M Co., St. Paul 6, Minn., Dept. OL-47.

When inquiring check 2844 opposite last page

Methods of code marking cans reviewed in bulletin

Review of current methods employed in code marking of cans is contained in eight-page bulletin. Featured and described is company's coding method by which variably spaced scratches provide quality control information on metal cans.

"Dataline" bulletin is issued by Triple-E Engineering Co., Dept. CP, Racine, Wis. When inquiring specify 2846 on form which is located opposite last page.

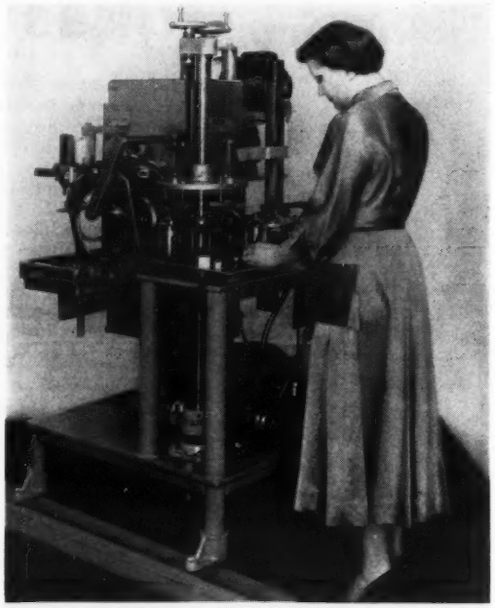
Labeling machine affixes labels to standing containers . . .

changeover in size or type of label or container takes two to five minutes

Uses: For high-production labeling of containers.

Features: Rotary labeling machine affixes labels from postage-stamp size to 6 x 8" on container sizes from fractional-ounce to gallons with change of minimum parts. Containers are fed in an upright position.

Description: Labeling operation is automatic except for feeding of containers into the machine. Label is affixed to container, secured by pressure pad, and discharged automatically. (Containers can be discharged onto a conveyor for further processing.) No adhesive is allowed to ooze out when labels are applied.



Operator feeds bottles upright into labeling machine

Labels are inserted into hopper while machine is in operation. Three hand adjustment wheels (for variable speed drive, label positioning, and upper-hold-down turret) control entire adjustment range. Machine is 65" high, 38" long, and 32" wide.

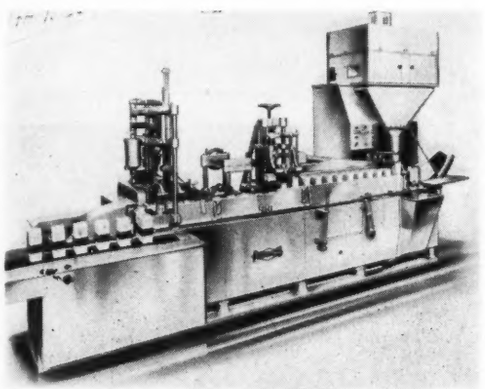
(Rotary labeling machine is manufactured by MRM Company, Inc., Dept. CP, 191 Berry St., Brooklyn 11, N.Y. Check 2848 opp. last page.)

Packs one- to five-lb bags with dry, free-flowing solid materials . . .

reported to turn out 1200-1900 bags/hr

Uses: Packaging dry, free-flowing materials such as cement, chemicals, and granulated plastics in square-bottomed, self-opening paper bags with capacities of about one to five lb.

Features: Depending upon number of weighers attached and size of bags used, production rates reported are 1200 to 1900 bags per hour. Machine can be equipped with checkweigher to eliminate packages outside tolerance limits, and a baling machine to automatically arrange filled bags and pack them into larger lots.



Automatic packaging machine consists of fundamental unit equipped with automatic feed of empty bags and two weighers for filling

Description: Fully automatic packaging machine consists of three elements: Fundamental units for shaking down the contents, closing and sealing of bag; up to three weighers for filling bag; and automatic feed of empty bags. Manufacturer claims that dusting is virtually eliminated and close weight tolerances are maintained. Filled bag has a paper-strip-sealed triple-fold closure.

(Type VUV packaging machine is supplied by Arenco Machine Co., Inc., Dept. CP, 25 W. 43rd Street, New York 36, New York . . . or for more information check 2849 opposite last page.)

Polyethylene Drums

(*Continued from page* 164)

Improved loading procedures are realized with light, space-saving polyethylene drums

storage with certain incompatible chemicals had affected the polyethylene so that cold weather brought about embrittlement.

However, handling ease, safety, and warehouse space saving had been proven and accepted by customers. The tests had also indicated that muriatic acid-based cleaners and hydrofluoric acid liquid laundry sours were ideally packaged in polyethylene.

Shipping containers were made up using various overpacks. Steel drum was used to enclose the muriatic acid plastic drum; plywood for the up to 35% hydrofluoric acid solutions. Then the ICC granted permission for further test shipments.

Thousands of shipments were made — complete trips in all kinds of weather.

Results: In April of 1955, the Bureau of Explosives recommended and the Interstate Commerce Commission adopted the polyethylene drum with overpack as an approved container for shipment of these chemicals. It was the first plastic drum to receive the marking — I.C.C.-2S. Complete changeover from carboys has been made.

Specific advantages, according to Pennsalt, are: lower maintenance costs, reduced freight costs (drums are approximately 1/3 the weight of carboys and take 40% lower freight rate), sturdiness (practically unbreakable in normal transportation), and space saving (allowing bigger loads in shipments and less warehouse space).

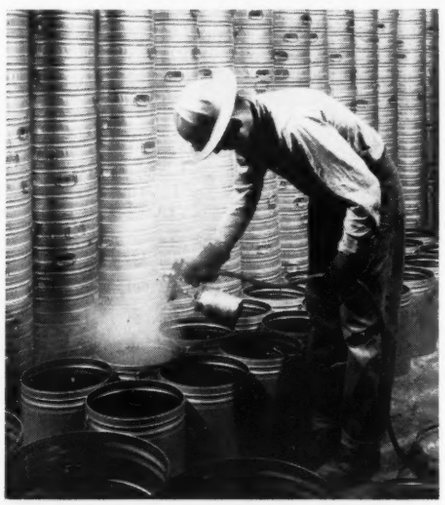
While Pennsalt's experience showed polyethylene is not a universal packaging material, definite benefits can be realized with the right products. Pennsalt now says the drums have entirely fulfilled initial expectations.

(Molded polyethylene drums are manufactured by Delaware Barrel and Drum Co., Dep. CP, P. O. Box 1648, Wilmington, Del. . . . or for more information check 2852 opposite last page.)

Folder describes developments in unit packaging

Company's latest developments in unit packaging are related in four-page folder. Illustrations show operation of complete packaging line, including recently developed cartoner. Various brand packages made on equipment are shown, with description of how company's packager is adapted to fill them.

"A Packaging Production Line" is issued by Bartelt Engineering Co., Dept. CP, 1900 Harrison Ave., Rockford, Ill. When inquiring reader may simply check 2856 on the convenient Reader Service slip which is located opposite last page.



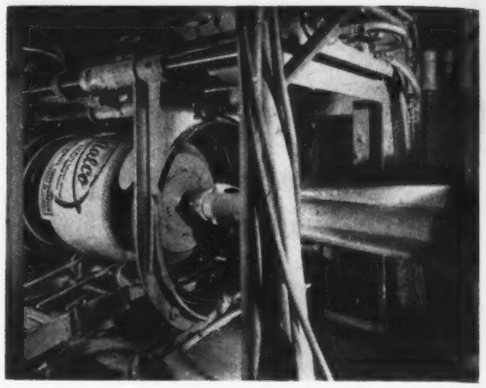
Solution to asphalt packaging

PROBLEM: When Leonard Refineries, Alma, Mich., began packaging asphalt for pipe-covering insulation in 50-lb cans, they found that asphalt stuck to its container and had to be heated to be even partially removed. Containers are filled direct from still when asphalt temperature is around 500°F — too hot for any organic coating to withstand.

SOLUTION: They tried a semi-organic silicone coating and came up with just what they were looking for. Cans are fog-coated with spray gun just before filling. To accelerate curing, solution of lead catalyst in light kerosene is mixed into the silicone. Resulting solution air-dries almost immediately.

RESULT: Nonstickiness of coating is such that customers just slash down the side of the can and strip it away from the cylinder of asphalt.

(Silicone 1107 coating is manufactured by Dow Corning Corp., Dept. CP, Midland, Mich. . . . or for more information check 2857 which is located on form opposite last page.)



Lining material is applied by high-speed centrifugal sprayer giving uniform lining-thickness throughout drum body

Here is a centrifugal-spray process for producing steel drums with higher quality linings. With improved methods of spraying and curing . . .

At a recently held press conference, a centrifugal spray method of applying inner-coat linings to lithographed steel drums was demonstrated. This, coupled with a high temperature curing process, is aimed at producing linings for improved product protection. Possibility of contamination from drum is greatly decreased.

Previous production-line method called for air-actuated spraying of drum interior. Effectiveness of operation depended to a great extent on skill of operator and satisfactory technology to assure uniform coverage. Moreover, the drum body was rotated on its axis as it was being sprayed. This motion created air turbulence which, in turn, made it possible for dirt, dust, grease and other impurities to get into lining material. In addition, lining thickness could vary and leave weak spots.

The large amount of solvent needed to spray the lining material would sometimes be responsible for formations of pinholes or blisters during curing process.

All these problems have been eliminated with the installation of a mechanical centrifugal spraying process. By this method, lining material is sprayed out through perforated high-speed rotor which travels longitudinally in and out of the drum body. The material is atomized by centrifugal force — amount

Drum bodies are carried in upright position through curing oven. Chimney action of hot air through drum gives rapid and uniform evaporation of solvent

thickness of drum lining varies only 1/10 mil

Procedure assures uniformity throughout drum body, including swage areas

of solvent used being greatly reduced. Turbulence is eliminated by absence of air pressure in the spray and by the fact that it is not necessary to rotate the drums at this stage. Even distribution of the lining material throughout the drum is the result.

The wide range of lining materials and their different characteristics requires flexibility in equipment for curing linings. These different materials call for different amounts of applied heat and speed with which drum bodies and heads move through the ovens.

There has been an improvement in the curing process, too. Originally traveling horizontally through curing oven, drum bodies now are carried in an upright position. In being upright, each drum body induces a chimney-like updraft, in which hot air at controlled temperatures passes over recently applied lining. Solvents are rapidly removed to eliminate pinholes and blistering. Variable sheave on drive shaft of conveyor permits adaptation of speed to curing requirements. An entirely different oven specifically handles drum heads.

(For further information on steel drums with linings applied by centrifugal action contact Rheem Mfg. Co., Dept. CP, 7600 S. Kedzie Avenue, Chicago, Ill. . . . or for more information check 2860 on form opposite last page.)

Poisonous-gas detectors are supplied as four different crayons — crayon 1 for traces of phosgene, crayon 2 for very high concentrations of phosgene and Lewisite, crayons A and B used together for traces of hydrogen cyanide, crayon B alone for cyanogen halides

CP Staff Photo

Here is a simple, yet sensitive, method for detecting presence of hydrogen cyanide, phosgene, or cyanogen chloride in low concentrations. On wood, paper, stone, or painted surface . . .

crayon mark's color change is poison gas warning

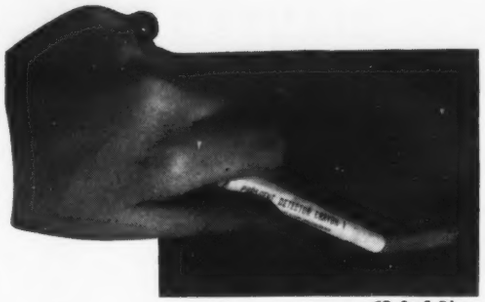
Uses: Chemical crayons that flash warnings in color are being offered as safety and testing devices for the laboratory and plant wherever phosgene, hydrogen cyanide, cyanogen halides, and Lewisite are used.

Originally developed by the Army Chemical Corps to detect the presence of these war gases, the crayons are finding peacetime civilian use. They provide a means of detecting leaks in cylinders and systems. Also, they can determine when it is safe to re-enter areas that have been accidentally or purposely exposed to the gases.

Features: Crayons provide simple, convenient, inexpensive means of detecting these gases. Marks made by rubbing crayons on any suitable writing surface (paper, wood, stone, painted areas) develop distinctive colors when exposed to particular gases.

They are sensitive enough to detect concentrations that are stated as being maximum average allowable for human exposure over eight hour period — *i.e.*, 1 ppm of phosgene and 10 ppm of hydrogen cyanide.

Description: Detectors consist essentially of commonly known sensitive de-



CP Staff Photo

Crayons will make a mark on any suitable writing surface. This mark will change from white to pink in about 30 to 60 seconds when exposed to 1 ppm of phosgene

tector-chemicals mixed with fillers and binders, and incorporated into crayon form.

There are four crayons — two for detecting high and low concentrations of phosgene, and two to be used conjunctively for hydrogen cyanide. The phosgene detector for high concentrations will also give a color change upon exposure to Lewisite. One of the hydrogen cyanide crayons also detects cyanogen halides. Each comes sealed in glass tube and labeled with instructions for using.

Marks made by the sensitive phosgene detector-crayon turn pink or salmon color in presence of low concentrations of phosgene . . . color change for 1 ppm of phosgene takes about 30 to 60 seconds. Higher concentrations will give a more rapid change.

Very high concentrations of phosgene may bleach the sensitive detector's pink mark. Therefore, a second crayon is available for higher concentra-

(*Please turn to page* 175)

Crayons are simple, inexpensive safety and testing devices for laboratory and plant use

ENTOLETER® NEWS

ENTOLETER DIVISION • Safety Industries, Inc. New Haven 4, Connecticut

Vol. 1, No. 1 April 1957

"Entoleter" New CentriMil SERIES 40 NOW AVAILABLE TO CHEMICAL PROCESSORS

The Entoleter Division announces the "Entoleter" CentriMil Series 40 for applications requiring extreme impact velocity (35,000 feet per minute) or enormous capacity (up to 250,000 pounds per hour) . . . such as . . .

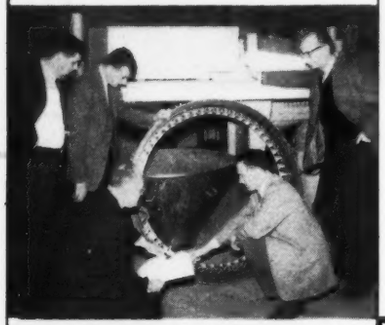
. . . materials to be reduced in size along natural cleavage lines (asbestos, cork)

. . . the particle size reduction of mixtures in which only one material must be reduced, so that it may be separated from the mixture (starch from fiber, handbark from cork)

. . . heat sensitive materials (thermosetting plastics, sugar)

. . . crystalline solids or friable materials (salts, magnesium oxide)

. . . particle size reduction with minimum range of sizes.



One of the specially designed liners for the "ENTOLETER" CentriMil Series 40, being examined in the Entoleter laboratory.

The "Entoleter" CentriMil Series 40 features...

A ROTOR...
which weighs over 500 pounds, dynamically balanced by electronic devices, with 40 specially designed impactors which travel at speeds of over 7 miles per minute.

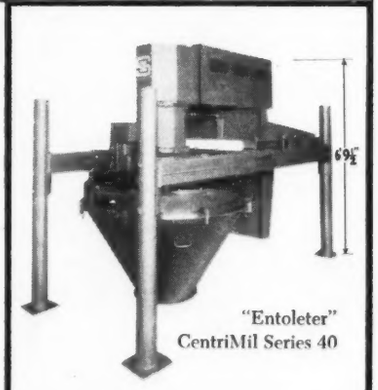
MOTOR...
available up to 125 hp in constant speed design or 60 hp variable speed, providing capacities to meet the needs of the largest processing plant.

WEAR and CORROSION RESISTANT PARTS...
for special applications . . . stainless steel construction and impact surfaces of special wear resistant materials are provided.

LUBRICANT...
of the latest oil mist type for the main bearing to insure proper lubrication for continuous service.

The design and development of the "Entoleter" CentriMil Series 40 adds one more chapter to the "Entoleter" story . . . culminates 17 years of product development which has kept pace with the demands of the expanding chemical industries...

- the "Entoleter" Standard 14" Impact Mill for blending and intimate dispersion, capacity to 8 tons per hour.
- the "Entoleter" 27" Impact Mill increased velocity for more intimate dispersion and particle size reduction, capacity to 30 tons per hour.
- the "Entoleter" Aspirator . . . for separation by air, of mixtures consisting of materials of varying density or air foil.



"Entoleter" CentriMil Series 40

ENTOLETER DIVISION
SAFETY INDUSTRIES, INC.
P.O. Box 904 New Haven 4, Conn.

HOW WE CAN HELP YOU...

The Entoleter Laboratory is continually developing new applications . . . contact us . . . send your specifications and a sample of your product for processing (free of charge).

When inquiring check 2865 opposite last page

SAFETY

No down-venting hazards with underground tank having this vent . . .

air vent faces upward, still allows no water into tank

Uses: Mounts on vent-pipe from underground storage tanks to permit vapors to escape in upward direction.

Features: Design is such that no water can get into tank. Upward projection of vapor reduces fire and explosion hazards due to down-vented vapors.

Air vent for underground tanks has hood to capture and prevent water from entering system

Description: Three-piece construction includes hood, screen, and body which are assembled with single center screw. All parts are made of aluminum except removable brass screen which serves as a filter.

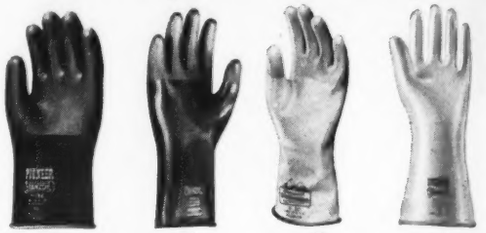
To prevent water from entering system, opening is covered with cone-shaped hood, having three spouts to drain off water.

Body, slightly larger than pipe, can be installed close to wall and has no threads. It is held firmly in place by tightening screw. All parts can be removed easily for inspection or cleaning.

(No. 45 "Up-Flow" air vent is manufactured by Universal Valve Co., Dept. CP, 607 South St., Elizabeth, N.J. . . . or for more information check 2866 on the Reader Service slip which is located opposite last page.)

A Long-Wearing PIONEER Glove

For Every *Hand*...Every Job



A B C D

A Stanzoil Black All Neoprene . . . . . 7 sizes, 5 lengths, 3 weights
B Stanzoil Red All Neoprene . . . . 3 sizes, 10½" length, sheer wt.
C Whitecap White All Neoprene. . . . 3 sizes, 10½" length, light wt.
D Stanzoil White All Neoprene . . . . . 7 sizes, 4 lengths, 3 weights

E F G H

E Stanzoil Knit-Lined Neoprene . . . . 5 sizes, 3 lengths, 2 weights
F Stanzoil Flock-Lined Neoprene . . . 3 sizes, 10½" lengths, light wt.
G Pacemaker Black Neoprene Coated Flannel . 2 styles, 4 lgths., 2 wts.
H Pacemaker Red Neoprene Coated Flannel . 3 styles, 3 lgths. 2 wts.

I J K L

I Stanflex Blue Plastic Coated Jersey . Full and Palm-Coat, 3 styles
J Stanflex Knit-Lined Red Plastic . 4 sizes, 11" length, medium wt.
K Sheergrip Rubber or Neoprene . . . . . 9 sizes, 3 lengths, sheer wt.
L Nimble Fingers Pylox® Vinyl . . . 3 sizes, 10½" length, extra sheer

Mail This Coupon Today!

The PIONEER Rubber Co.
241 Tiffin Road (Line)
Willard, Ohio, U.S.A.

Pioneers in Hand Protection — For Over 35 Years

Please send me:

- ☐ The name of my nearest PIONEER Glove Distributor.
- ☐ 1956-57 PIONEER Industrial Glove Catalog.
- ☐ Hand Protection Clinic glove recommendation for job described in enclosed letter.

Firm _____

Address _____

City _____ Zone ___ State _____

Signed _____

When inquiring check 2867 opposite last page

Crayon Gas Detector

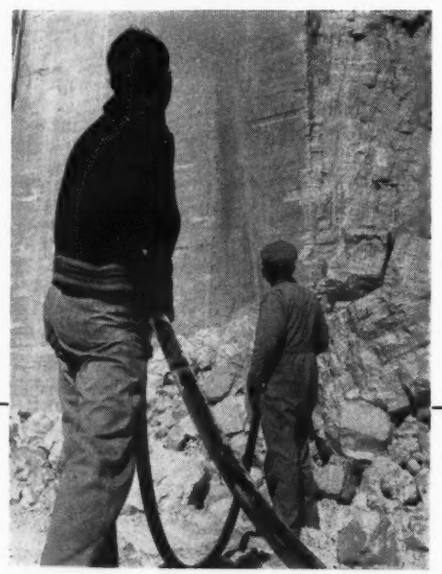
(*Continued from page* 173)

tions. The less-sensitive crayon gives a tan mark that turns green when exposed to high concentrations of phosgene. It will gradually change to blue and then violet on standing. Lewisite liquid or vapors cause it to turn greenish-blue.

Hydrogen cyanide detectors are marked "crayon A" and "crayon B". Crayon B is applied over marks made by crayon A to give a mixed mark containing ingredients from the two. Resultant "mix" will turn reddish-pink in presence of hydrogen cyanide — after five minutes at 10 ppm. On standing, pink color will darken to purple or blue.

Crayon B may be used by itself to detect cyanogen chloride or cyanogen bromide. The mark will turn reddish-pink in one minute when exposed to 4 ppm of these gases.

(Poisonous-gas detector crayons are manufactured by Aromil Chemical Co., Dept. CP, 5646 Belle Ave., Baltimore 7, Md. . . . or for more information check 2868 on form opposite last page.)



Dacron-jacketed fire hose

. . . is being used at a southern sulfur plant to fight fires. Company has found that jacket of 100% Dacron withstands abrasion and existing acid conditions better than other types previously used. Tests run on 1½" hose show that it is capable of pressures to 200 lb.

(Fire hose is manufactured by Textile Fibers Dept., E. I. DuPont de Nemours & Co. (Inc.), Dept. CP, Wilmington, Del. . . . check 2869 opposite last page.)

alphabetical index on page 257

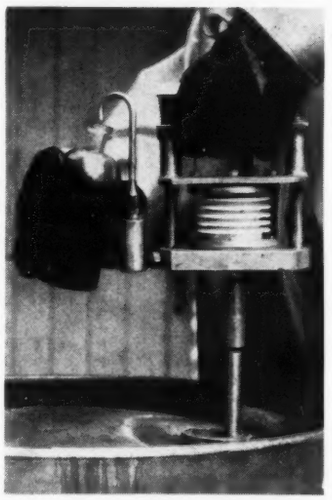
. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 257. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader in finding what you want . . . in a hurry!

Lead oxide safety

Tips on safe handling and use of lead oxides are presented in 12-page data sheet. Topics covered include properties and hazards of lead oxides, engineering control of hazards, employe safety, handling and storage, waste disposal, and medical management.

To obtain Chemical Safety Data Sheet SD-64, remit 30c direct to Manufacturing Chemists' Association, Inc., Dept. CP, 1625 Eye St., N.W., Washington 6, D.C.

Hand-operated sampler cuts nitric acid testing hazards



Uses: To obtain samples for nitric acid testing in field work, laboratory, or factory operations.

Features: Samples can be removed from containers with less danger of spilling acid.

Description: Device, weighing only 3 lb, is operated by placing pick-up tube in container and pumping hand lever to transfer acid into sample receptacle.

(Model 4591 sampler is manufactured by Texas Metal and Manufacturing Co., Dept. CP, 6114 Forest Park Road, Dallas, Texas. Check 2872 on form opposite last page.)

Covers head, shoulders, needs no airline

Chemical-resistant hood has "breather-tunnel" for use where ambient air is safe

Uses: Protecting plant personnel when there is danger of splashing chemicals.

Features: Hood has "breather-tunnel" which eliminates need for air lines or self-contained air supplies where ambient air is safe to breathe. Elimination of air lines gives wearer free movement.

Protective hood has inverted "breather-tunnel" in front

Description: Air inlet system is an inverted V-shaped tunnel. Liquids run harmlessly over top of tunnel. Seams are armored, not coated, for added protection against seepage into hood.

Clear acetate window measures 16-3/8 x 8". Ratchet headgear is adjustable to any one of 32 head sizes.

(Self-ventilating hood is manufactured by Standard Safety Equipment Co., Dept. CP, 232 W. Ontario St., Chicago 10, Ill. . . . or for more information check 2875 on form opposite last page.)

This month's Processing and Engineering Data section starts on page 82

Although reduction of hot spots and pot burnout was initial reason Esso Standard switched from conventional atmospheric burners for soap cooking, most important result was to . . .

cut soap cooking time to less than half with radiant heat burners

THEODORE W. WETT, Assistant Editor
With **R. L. ALBRIGHT,** Chief Engineer
Esso Standard Oil Co., Pittsburgh, Pa.

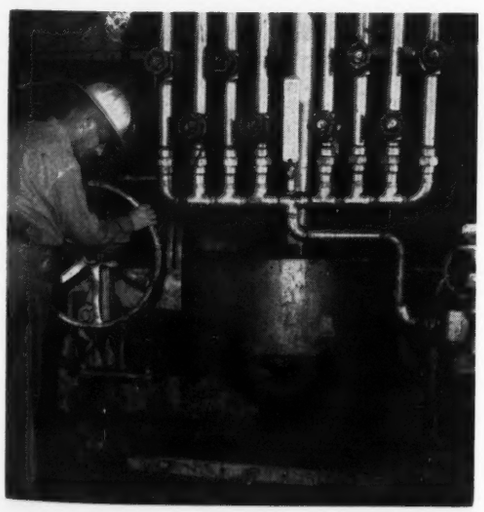
Problem: Open flame gas burners, used at Esso Standard to cook soap for industrial greases, caused pot burnout and hot spots. Lack of complete uniformity in heating was a potential source of product flashing, with formation of undesirable combustion products in batch being processed.

In preparation of industrial greases, 18,000-lb batches of soda-lime soap, 10 to 50% in strength, are heated to a specified temperature and cooked to obtain proper consistency. It is then blended with various grades of oil, depending on product desired, and drained or pumped directly to containers.

Solution: Esso installed a test unit of a heating system based on the radiant heat principle. Operation was successful enough to warrant a plant scale installation of three entirely new units and replacement of seven atmospheric units as vessels were relocated during plant expansion.

(*Please turn to page* 180)

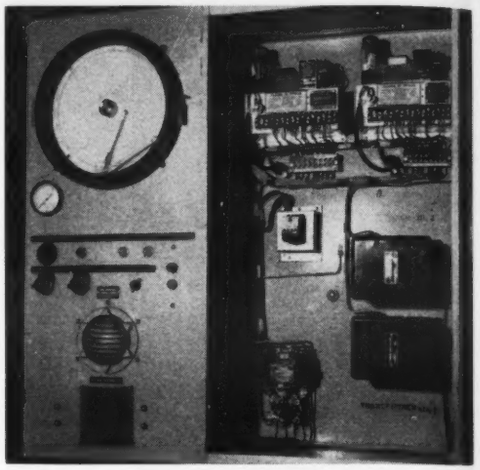
Portion of 24 burners (arrow) which heat 18,000-lb batches. Processing time was reduced from five to two hours when radiant heat units replaced conventional units



Operator checks soap-oil mixture before emptying kettle heated by radiant heat burners

Cut Soap Cooking Time

(*Continued from page* 178)



Programing controls for automation of soap cooking step in grease preparation

In radiant heat system a burning mixture of gas and air raises a refractory bowl surrounding burner to incandescent temperature (2300°F). Infrared rays generated by refractory provide radiant heat. High temperature of refractory bowl assures complete combustion of gas-air mixture.

Each vessel is equipped with 24 burners. Combustion air is supplied by a 1½-hp motor and blower. Flame is automatically cut off if any portion of system fails. Units are equipped with programing controls to permit completely automatic processing.

Results: Time to process soap batch has been reduced from five hours to two. Heat is uniform, and there is no flame impingement, so that hot spots and pot burnout are no longer a problem. Efficiency of heaters has stabilized operating procedure to a point where company is considering complete automation of soap cooking operation. Programming controls are installed, and data are now being gathered.

(Radiant heat burners are a product of Burdett Manufacturing Co., Dept. CP, 4920 S. Monitor St., Chicago 38, Ill. . . . or for more information check 2880A on the convenient Reader Service slip which is located opposite last page.)

Your guide . . . to more processing equipment and ideas is the alphabetical product directory beginning on page 257

Compact, mobile unit provides fast cooling from 95 to 25°F . . .

all parts in contact with product are stainless steel

Uses: Although designed originally for cooling lotions, tonics, and perfumes, cooler has characteristics which may make it useful in other types of chemical or allied process work.

Features: Cooler is a complete independent unit mounted on casters, ready for use. Unit need

Compact cooler is mounted on casters, can be moved anywhere in the plant

only be plugged into 115/230v electrical outlet to start operating. All parts coming in contact with product are made of 304 or 316 stainless steel.

Description: Unit is designed to cool materials from 95°F down to 25°F with controlled, uniform temperatures. Cooler operates fully automatically. Complete packaged unit includes Freon-12 condensing unit.

Equipment is available in ten sizes ranging from ½ to 15 hp. Largest unit can chill 210 gph from 95 to 35°F. Smallest model measures 54 x 22 x 41" high. Largest is 80 x 36 x 62". Removable head on each end permits easy cleaning.

(Model KFC coolers are product of Kol-Flo Kooler Co., Dept. CP, Bayonne, N.J. . . . or for more information concerning this product, reader may simply check 2881 on the convenient Reader Service slip opposite last page.)

Closed-circuit subliming system runs continuously for months without shutdown

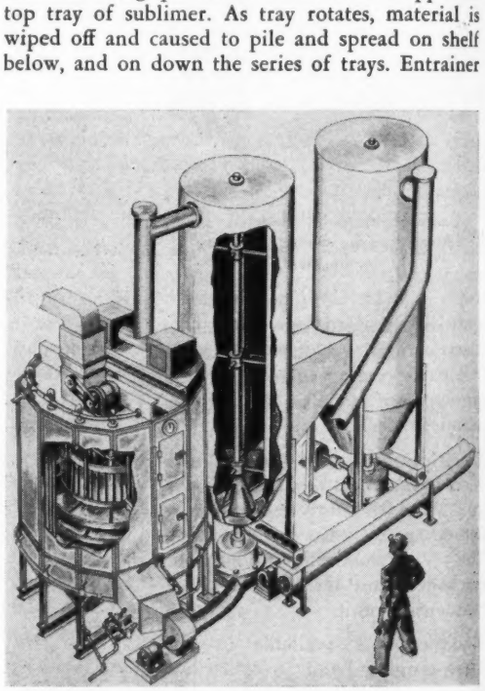
Operates at atmospheric pressure; scrapers prevent product build-up on condenser walls

Uses: Purifying solid materials by sublimation.

Features: Closed-circuit system operates at atmospheric pressure, automatically, and continuously, for several months without shutdown.

Description: Equipment consists of manufacturer's Turbo-Dryer, a sublimer, feed hopper, recirculating fans, condensers, and reheater. Sublimer has tier of tray shelves and turbo fans rotating on same vertical axis within a cylindrical insulated housing.

Material being processed is fed from hopper to top tray of sublimer. As tray rotates, material is wiped off and caused to pile and spread on shelf below, and on down the series of trays. Entrainer



System consists of dryer, sublimer, feed hopper, recirculating fans, condensers, and reheater

gas is recirculated uniformly over each tray shelf, picking up vapor given off by the material being processed. Gas then passes through a filter and into series of condensers.

Rotary scrapers prevent build-up of condensed material on the condenser walls, assuring high rate of heat transfer. Filtered entrainer gas is then reheated, and recirculated through sublimer.

Systems are supplied as completely shop-assembled

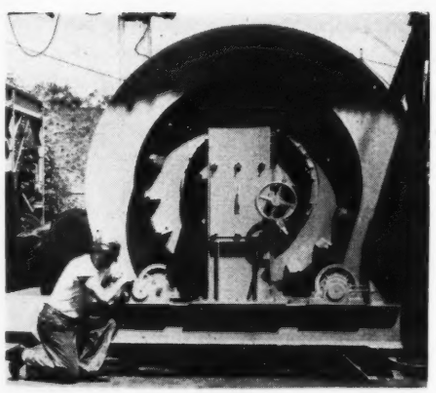
units in sizes from 60 to 360 sq ft net tray area. Larger units, up to 18,000 sq ft tray area, are also available. These are sub-assembled at the plant and must be field erected.

(Closed-circuit subliming system is product of Wyssmont Company, Inc., Dept. CP, 2700K Bridge Plaza South, Long Island City 1, N.Y. . . . or for more information check 2884 on the convenient Reader Service slip which is located opposite last page.)

Describes sulfur-burning furnaces and engineering services

Bulletin of six pages pictures and describes burning equipment for sulfuric acid plants and for the production of sulfur dioxide for paper mills and other industries. Description includes sulfur melting pit, pump, burner, air blower and furnace. Operating advantages are listed, and chart shows sulfur pump and burner capacities. Company's engineering services are outlined.

Bul S-110 is issued by Chemical Construction Corp., Subs. of Electrical Bond & Share Co., Dept. CP, 525 West 43rd St., New York 36, N. Y. When inquiring specify 2885 on form located opposite last page.



Built for big batches

All-stainless-steel blender will handle up 20,000 lb per batch. Believed to be the largest stainless steel blender in existence, unit will be used in a Missouri AEC plant on classified operations. Blender has specially-designed leak-proof stuffing box, and features four-way mixing action.

(Blender was manufactured by Sturtevant Mill Company, Dept. CP, 2 Harrison Square, Boston 22, Mass. . . . or check 2886 opposite last page.)

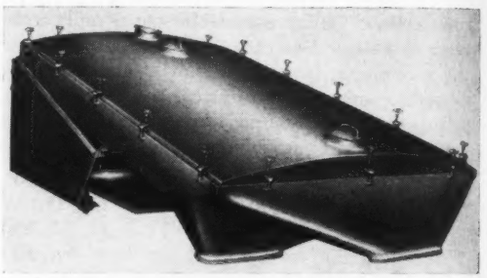
All points of screen separator can be rapidly cleaned . . .

unit is adaptable where process layout requires minimum height and single screen

Uses: Sifting relatively coarse mesh materials.

Features: Unit is particularly adaptable where process layout requires minimum overall height and single screen operation. Equipment is suitable for applications where all points of screen must be readily accessible for rapid cleaning.

Description: Case and drive are flexibly mounted on base consisting of floor plate, vertical tubular steel column, and suspension frame. Drive force is developed by eccentric lead balance weight attached to vertical shaft. Shaft is mounted on two



Compact screen separator is particularly adaptable for limited-space applications

heavy-duty, self-aligning roller bearings. Unit is constructed of carbon steel with top cover and screen frame of aluminum. Various sizes of screen areas are available ranging from 5 sq ft in 2x2½' size to 35 sq ft in single screen 5x7' size.

("Gyro-Shaker" screen separator is manufactured by Sprout-Waldron & Co., Inc., Dept. CP, Muncy, Pa. Check 2888 opposite last page.)

Loads up to 14,000 lb mixed in rotary batch blenders at Celanese . . .

have operated nearly nine years with virtually no downtime or maintenance

Blending up to 14,000 lb of material at one time may sound like a tall order, but it is just another routine operation at the Celriver plant of Celanese Corporation of America, Rock Hill, South Carolina. Mixing raw material for later processing into acetate, viscose, Fortisan, Fortisan-36, and Arnel triacetate, four huge batch blenders have been handling such loads efficiently for nearly nine years at the plant with virtually no downtime or maintenance.

To assure high quality yarn and to avoid serious

Paul A. Brooks, General Foreman at Celanese plant, checks one of the four blenders

problems along the production sequence, it is important that the raw materials be thoroughly blended. Because of this, it is necessary at times that whole carloads be blended at the same time to assure the critical uniformity that insures top quality.

The carbon steel plate units have a four-way mixing action. As materials enter the rotating drum (both intake and discharge are at same end for simplicity of operation) they are picked up by a series of revolving buckets and carried to the top of blending chamber where they are cascaded and mixed. Blenders are designed so that the material is constantly being forced from both ends of the drum to the middle. Added to the revolving action of the drum, swinging chutes produce an important lateral fourth mixing action.

Material can be charged and discharged while units are in operation. "Open door" construction permits easy accessibility for cleaning and maintenance. Blenders are equipped with a dust seal which prevents material loss, air pollution, and worker discomfort.

(Model 12 rotary batch blenders were manufactured by Sturtevant Mill Company, Dept. CP, 119 Clayton Street, Boston 22, Mass. . . . or for more information check 2890 opposite last page.)

Tells how to select size of separation magnet

Five types of suspended separation magnets for removal of tramp iron in conveyor systems are shown in 12-page bulletin. Complete specifications and operating principles of all types, along with photographs and drawings are presented. Instructions and tabular data detail how to select proper size of suspended separation magnet.

Bul 1031 is issued by Stearns Magnetic Products, Division of Indiana Steel Products Company, Dept. CP, 635 S. 28th St., Milwaukee 46, Wis. Specify 2891 opposite last page.

When inquiring check 2893 opposite last page

Reduces dissolved solids water to useable level

Bulletin of 20 pages tells about manufacturer's membrane demineralizing equipment and process. Description, uses, and equipment installation are discussed. Performance data are detailed. An outline of basic principles of operation is implemented by flowsheets of demineralizing units. Chart shows approximation of installation costs. Illustrations of typical installations are included.

Bul 3 is issued by Ionics Incorporated, Dept. CP, 152 Sixth St., Cambridge 42, Mass. When inquiring specify 2894 on form opp. last page.

Porous media for gas diffusion and liquid filtration

Chemical and physical properties of porous media for gas diffusion and liquid filtration are described in four-page technical bulletin. Graphs showing relations between grade and average pore diameter, pressure drop and gas volume flow, and effect of thicknesses on pressure drop and gas volume flow are part of data presented.

Form ESA-267 is issued by Simonds Abrasive Co., Dept. CP, Tacony & Fraley Sts., Philadelphia 37, Pa. Specify 2895 opposite last page.

"Let me illustrate . . . The elements are made up of tiny particles called atoms, and these atoms contain even smaller particles . . ."

When inquiring check 2896 opposite last page

Electronically controlled roller expanders lock the tubes in position in tube sheets during fabrication of all Pfaudler heat exchangers

How to save money on

Heat Exchangers

Would you like to skip the extra expense of buying custom built heat exchangers?

Pfaudler has taken design features previously associated only with custom built units and *standardized* them.

For a given heat transfer area, select the most applicable combination of length and diameter. Nozzles can be of any size, located in any position and either threaded or flanged. This flexible standards program applies to fixed tube sheet, single or multipass, tube and/or shell side stainless steel units in diameters up to 30". Over all cost is reduced and delivery speeded up.

Pfaudler also offers heat exchangers for severe corrosive services, combining alloys with low cost glassed steel parts, wherever practical, to keep costs to a minimum.

Any one of these designs can save you money, give you better results. Regardless of your heat exchanger needs, it will be to your advantage to check with us before buying. Let us send you our complete Heat Exchanger Manual.

THE PFAUDLER CO.
ROCHESTER 3, N.Y.
Specialists in corrosioneering

When inquiring check 2897 opposite last page

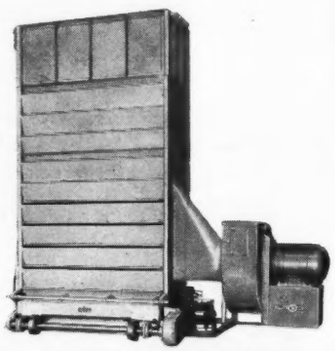
Cooler has automatic pellet- and air-flow control . . .

rate of discharge is adjusted to rate of charging

Uses: Cooling and drying pellets automatically.

Features: Pellet flow control is automatically regulated. Rate of discharge is adjusted to rate of charging from pellet mill. Hinged louvers provide automatic air flow control.

Description: Pellets are spouted into stainless-steel-lined hopper at top of cooler and split into two columns by stainless steel deflector. Each column flows by gravity onto a shaking shoe,



Cooler has independently-hinged, moveable louvers that provide automatic air flow control

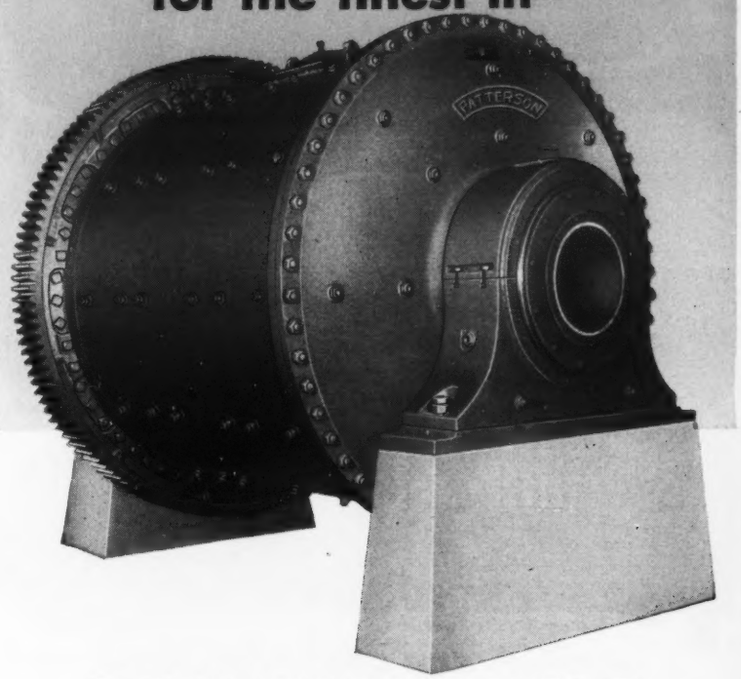
and then to discharge chute. During downward flow, pellets pass through transverse air stream which gently and gradually cools them.

Hinged louvers insure efficient cooling of pellets regardless of size of run. Each louver is independently hinged so that it operates automatically, as required by height of pellets in cooler.

Cooler has all-steel base. Stainless steel is used on all critical parts which come in contact with moisture-laden air. Floor space requirements range from 6′ x 5½′ x 8′ high to 6′ x 5½′ x 14′ high.

(Coolaire pellet cooler and dryer is product of Sprout, Waldron & Co., Inc., Dept. CP, Muncy, Pa. Check 2898 opposite last page.)

IT'S *Patterson*
for the finest in—

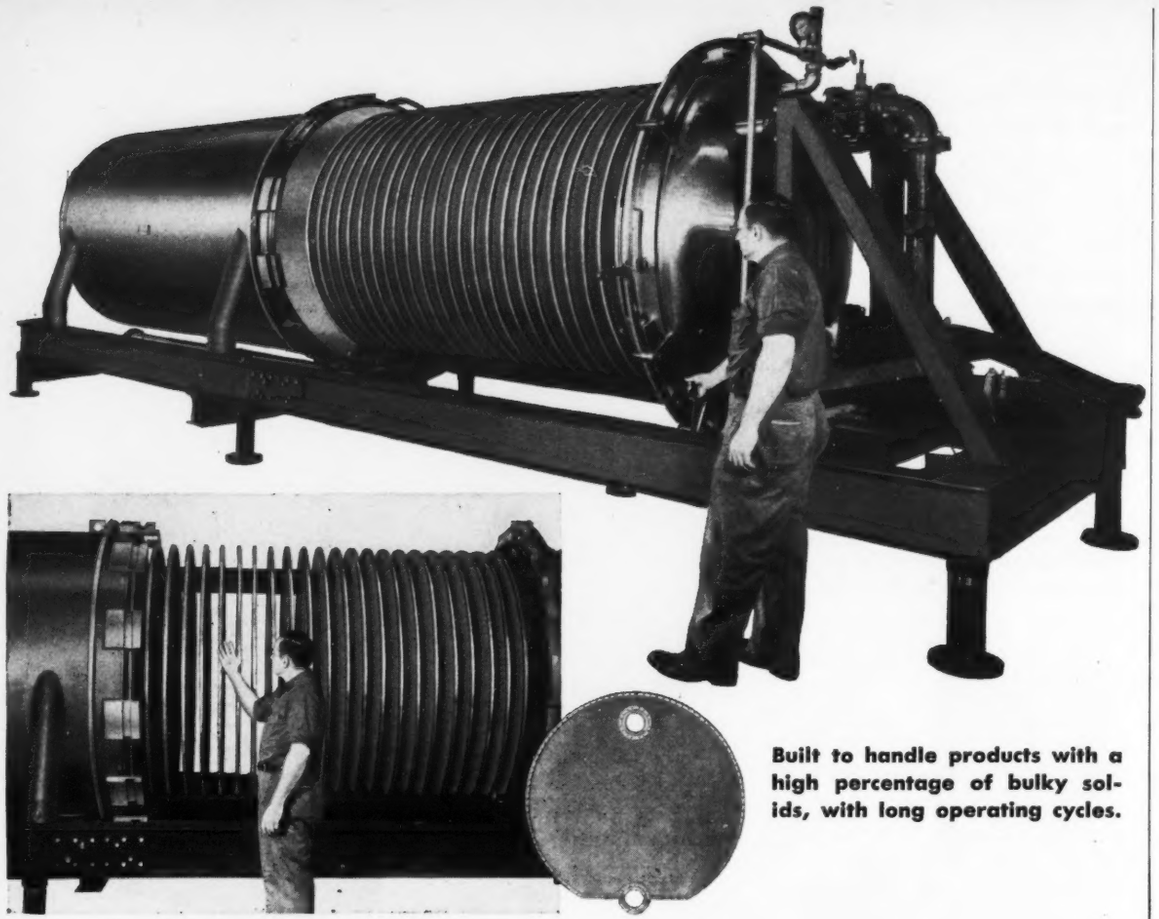


CONTINUOUS GRINDING

Materials, coarse or fine, are produced to uniform quality standards by versatile Patterson Continuous Ball, Tube and Rod Mills. Continuous feed and discharge, wet or dry, in open or closed circuit, produces the utmost in grinding performance and economy. Each Patterson Mill is engineered for its job—mill speed, type of liner, mill size, feeder and other factors are specified for the actual grinding application. Media can be steel balls; Porox standard-weight or Arlcite high density balls; pebbles, or rods. *Write for details!*

The Patterson Foundry and Machine Company
A Subsidiary of Ferro Corporation
East Liverpool, Ohio, U. S. A.
The Patterson Foundry and Machine Company, (Canada) Limited
Toronto, Canada
MONTREAL

When inquiring check 2899 opposite last page



Built to handle products with a high percentage of bulky solids, with long operating cycles.

SPARKLER Heavy Duty Filter Model MCR

Retractable tank... quick opening filter

1. The retractable tank, with labor-saving hydraulic power, and finger tip control, is the answer to the demand for an automatic fast-opening filter.
2. Fixed immovable head, eliminates the necessity to break pipe connections with the attendant danger of spillage in opening the filter.
3. Fast action, Sparkler Passalaqua, cover seal. Locking ring actuated by a single hand lever enables the operator to break the filter cover seal in seconds without mechanical power. O-ring gasket seal tightens with increased internal pressure. A.S.M.E. approved.
4. MCR plates have a large outlet at the top in addition to the bottom drainage outlet. This reduces flow resistance through filter elements.
5. Plates are spaced far apart with plenty of room to develop a full size cake without clogging or restricting flow space. This increases the total throughput and results in a longer cycle.
6. The MCR filter is designed to speed up all heavy duty filtering operations with a resulting lower labor cost and greater daily output.

Available in capacities of 100 sq. ft. to 2000 sq. ft. Write for bulletin and give details of your filtering problem.

SPARKLER FILTERS

SPARKLER MANUFACTURING COMPANY
MUNDELEIN, ILLINOIS
Sparkler International Ltd., plants in Canada, Holland, Italy and Australia
Exclusive filtration engineers for over 35 years

When inquiring check 2900 opposite last page

Heavy-duty immersion heater is explosion-proof . . .

breathes constantly through junction box lead-in conduit, preventing pressure build-up

Uses: For heating various materials in chemical and allied industries.

Features: Heater is explosion-proof; it breathes constantly through junction box lead-in conduit, preventing pressure build-up inside of shell. Heavy-duty outer shell can withstand high mechanical shock.

Low temperature element on spiraled silica core allows wire to expand when heated without putting strain on outer shell

Description: Replaceable elements of fused silica immersion heater are guaranteed one year or 6000 hours. Complete units may last several thousand hours beyond guarantee if scale accumulation is occasionally removed. Low temperature element on suspended spiraled silica core allows wire to expand when heated without putting strain on outer shell. Standard sizes are available, others manufactured according to specifications.

(Immersion heater is product of Pyrosil Inc., Dept. CP, Cuyahoga Falls, Ohio . . . or for more information check 2901 opposite last page.)

Shows typical flow sheets of grinding applications

Proper application and selection of conical, tricone, cascade, rod, tube, and disc roll mills for dry grinding are discussed in 44-page bulletin. Various air classifying arrangements are described. Plant flow sheets show different dry grinding applications. Complete specifications for manufacturer's dry grinding mills are listed, along with detailed grinding performance data for large variety of materials.

Bul 17-C is issued by Hardinge Company, Inc., Dept. CP, 240 Arch St., York, Pa. When inquiring specify 2902 opposite last page.

Points out features of unit for purifying, drying gas

Features of equipment that combines gas purifying and drying in one unit are discussed in four-page bulletin. In addition to supplying oxygen-free hydrogen for atmosphere furnaces, unit can be used with nitrogen, argon, neon, and saturated hydrocarbons with same results. Facts on capacity, installation, power requirements, operation, and reactivation are listed. Labeled drawing helps show operation.

"Deoxo Puridryer" is issued by Instrument Div., Baker & Co., Inc., Dept. CP, 207 Grant Ave., East Newark, N.J. When inquiring about manufacturer's product reader may simply check 2903 on form opposite last page.

Oil viscosity chart featured in heat exchanger catalog

Design, capacity and dimension data for removable-tube-bundle heat exchangers are contained in 16-page, two-color catalog. Information necessary for selection and specification of heat exchangers for hydraulic equipment, diesel engines, gas engines, compressors, transformers, machine tools, and other applications is included. Chart plots oil viscosity at temperatures ranging in varience from 90 to 250°F.

Cat 1156 is issued by Young Radiator Company, Dept. CP, Racine, Wis. When inquiring about manufacturer's product reader may simply check 2904 opposite last page.

For more information on product at right, specify 2905 . . . see information request blank opposite last page.

for the laboratory

Mass spectrometer at work in United States refinery. Sample in glass flask is drawn into unit for analysis

At South Africa's SASOL plant — completely integrated to synthesize oil-from-coal — company's comment on elaborate test and control program is that its . . .

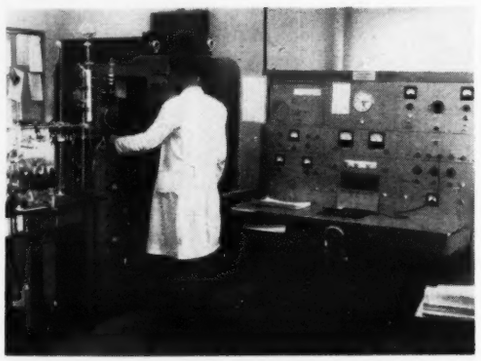
'most important tool' is mass spectrometer

Problem: Sheer number and complexity of analyses for process control and product testing at SASOL (South African Coal, Oil, and Gas Corporation plant) require an elaborate test and control program. World's first large-scale synthetic oil-from-coal plant needs about 300 routine analyses — plus 650 special analyses — every month. Each sample is analyzed for about six — and as many as fifteen — components. Of these, only about five are fixed gases such as hydrogen, nitrogen, argon, carbon monoxide, and carbon dioxide. Other components may be paraffins, olefins, or aromatics.

Tests for purity of single gases must be constantly made. Evaluation of trace components is extensively used to run material balances on plant processes. Concentrations of rare gases sometimes have to be determined.

Process control at SASOL means solving special plant problems involving Fischer-Tropsch reaction techniques. Coal is processed into conventional petro-

Night view of SASOL $112-million plant fifty miles south of Johannesburg. Plant produces 55 million imperial gallons of gasoline annually plus large quantities of diesel and heating oils, and chemicals



Analytical mass spectrometer in SASOL laboratory at Sasolburg, South Africa. Operator is standing at inlet cabinet. Magnet unit is in rear at center. Control console is at right

leum products and chemicals. After gasification of coal with steam and oxygen, remaining by-products are taken off for recovery of ammonia, phenols, tar products, and raw materials for production of ammonium-sulfate fertilizers. Complete analyses had to be made at every crucial process control point of gas steams and liquid products.

Solution: SASOL installed a mass spectrometer in July 1954 at the main laboratory. After an initial period devoted to training and getting acquainted with analysis methods, personnel began operating the mass spectrometer 'round the clock.

(Please turn to next page)

Mass Spectrometer

(*Continued from preceding page*)

Some of the routine samples handled are analyzed for ketones and alcohols in methanol, ethanol, or propanol. Other samples include mixtures of aldehydes and ketones up to C_7 in presence of alcohols to propanol, and traces of hydrocarbons to C_6.

Samples are mainly received in gaseous form, although almost 15% of the routine analyses are of liquids — mainly alcohols. Since average composition of some samples deviates little from normal, SASOL has found it advantageous to use "synthetic" control mixtures which closely resemble average analysis pattern. Running of previously-prepared mixtures as a "control" increases analytical accuracy and reduces time consuming calibration runs.

Calibration patterns are developed similarly for gas sample mixtures containing hydrocarbons above C_5 or C_6 in small and decreasing quantities. However, these "controls" are obtained by running distillation cuts from condensates of relevant gas streams.

Very simply explained, mass spectrometer bends a beam of electrically-charged atoms by passing it through a magnetic field. The sorting process, according to molecular weight or mass, provides a direct approach to determination of composition, independent of other properties of the molecule. Counting process gives an accurate record of relative quantity of each molecule being observed. Both speed and accuracy in analysis of both simple and complex structures are outstanding advantages.

Two eight-hour shifts each day are devoted to running nothing but plant sample analyses. Night shift is occupied with instrument checks, calibration runs, record keeping, and filing. Mass spectrometer team requires 13 physicists and technicians. Each of the two day shifts is manned by a physicist and two technicians, while the night is taken by technicians only. A senior man acts as co-ordinator to insure continuity between shifts.

Result: SASOL'S comment on its use of the mass spectrometer is: "Active interest in its capabilities has been aroused among experts of the continental fuel-process, who have now had the opportunity of seeing the instrument in action. Operating steadily, the mass spectrometer analyzes samples of gas and liquid mixtures, detects and solves special plant problems, and generally serves as our most important tool for quality control."

(Above is taken from paper entitled "Oil Wealth From Coal Mines" by Dr. J. D. Louw, Senior Chemist, Sasolburg, South Africa.)

(Analytical mass spectrometer is product of Consolidated Electrodynamics Corporation, Dept. CP, 300 N. Sierra Madre Villa, Pasadena 15, Calif. . . . or for more information check 2909 opp. last page.)

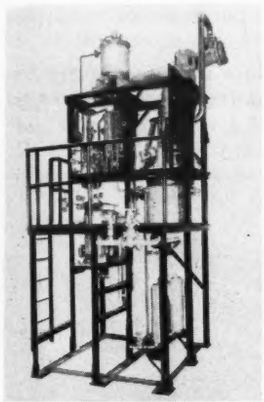
Package pre-assembled pilot plant is shipped intact — ready-to-install . . .

can be placed in operation simply by connecting utilities and installing instruments

Uses: As pilot plant unit for experimental production of wide range of products. Both endothermic and exothermic reactions can be studied.

Features: Pilot plant is pre-assembled package unit that is shipped intact — ready-to-install. It can be placed in operation simply by connecting power and water utilities, and installing instruments.

Description: Design of pilot plant is based on specified physical properties, as specific gravity, viscosity, boiling point, heat of reaction, incipient reaction temperature, and other laboratory data. Reactions can be controlled by automatic brine cooling and hot liquid heating systems. Interchangeable anchor and turbine agitators permit studies on mixing.



Pilot plant permits studies on mixing, endothermic and exothermic reactions

Unit includes a 35-gallon stainless steel reactor, heating and cooling systems, feed tank, condenser, decanter, two receivers, all connections, controls and instruments. Cost is in neighborhood of $25,000, depending on specific requirements.

(Pilot plant is product of Industrial Process Engineers, Dept. CP, 8 Lister Avenue, Newark 5, New Jersey . . . or for more information check 2910 on form opposite last page.)

Shows oxygen bomb calorimeters and pressure reactors

Replacement parts for all manufacturer's oxygen bombs, calorimeters, and pressure reaction apparatus are shown in two illustrated price lists of 12 and 16 pages. Detailed drawings indicate all parts of equipment.

Price Lists 56-1(Bombs and Calorimeters), and 56-2 (Pressure Reactors) are issued by Parr Instrument Company, Dept. CP, 211 Fifty-third St., Moline, Ill. When inquiring specify 2911 on form opposite last page.

When inquiring check 2912 opposite last page

Permits precise weighing in microgram range

Microbalance has sensitivity of 0.1 microgram; uses quartz fiber suspension

Uses: For precise weighing of microgram quantities. Constructed for use in analytical chemical field, balance has been adapted to study absorption phenomenon in physical chemistry. Deposit of thin metal film can be weighed and thickness determined. Diameters of material can be calculated by taking a measured length and weighing it. Wear of a metal object can be determined by loss of weight.

Features: Microbalance uses fused quartz torsion system with no knife edges to wear or get out of alignment.

Microbalance uses fused quartz torsion system with no knife edges to wear

Description: Microbalance has quartz beam and torsion fibers fused into a single unit. Instrument is a null point balance utilizing torsion supplied by a fine quartz fiber to return beam to original position. Small deflections of beam are detected by an optical system. Pan holders are suspended from hooks on the ends of the beam.

Balance is operated by bringing beam to position with aid of optical system. Position is read on a divided wheel. After addition of sample, beam is returned to original position by rotating front fiber. Divided wheel is again read. Difference between initial and final reading determines sample weight.

Balance has sensitivity of 0.1 microgram (up to 0.001 microgram on order). Total load capacity is four million times sensitivity. Quartz suspension

method reduces need for special mounting to reduce effects of outside vibration. Instrument is 12 x 12 x 15", weighs 35 lb.

(Model E Ultramicrobalance is product of Microtech Services Company, Dept. CP, Post Office Box 121, Berkeley, California . . . or for more information check 2914 on form opp. last page.)

Data on expansion coefficients, semiconductors, food values

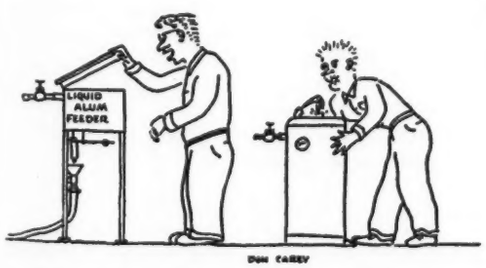
First supplement to booklet, "Selected Scientific and Engineering Tables and Data", has been published. Twelve-page supplement contains tables showing composition and value of foods, coefficients of linear expansion, semiconductor uses and data, and standard atmospheric data. There is also vibration nomograph and report writing information.

Supplement 1 can be obtained on company letterhead from United States Testing Company, Inc., Dept. CP, 1415 Park Ave., Hoboken, N. J.

Pictures lab supplies made of plastic

Over 60 items made from polyethylene are described and priced in 16-page illustrated catalog. In addition, there are plasticized polyvinyl chloride tubing, polyurethane sponge, and nylon tube fittings. One page is devoted to discussion of properties of polyethylene.

Cat E965 is issued by The Nalge Co., Inc., Dept. CP, 625 South Goodman St., Rochester 20, N. Y. Specify 2915 opposite last page.



"Call the pipefitters again, Jerry. Now we're getting water instead of alum!"

Don Carey is with the Mill Division of Owens-Illinois Glass Co., Valdosta, Ga.

briefs

from contemporary publications

Corrosion

This symposium on corrosion deals with why metals corrode, types of corrosion, combating corrosion, corrosion testing, and anticorrosion programs. Thirty-six pages, two tables, 35 figures, 33 photographs. (*"Power," December* 1956, *page* 73.)

Non-woven fabrics

Results of research on non-woven fabrics for apparel and household uses are reported. Low-melting fibers (up to 400°F) are used to bond higher-melting "base" or primary fibers. Four pages, nine figures. *("Modern Textile Magazine," October 1956, page 62.)*

Cooling towers

This paper deals with selection of counterflow cooling towers and provides complete analysis and prediction of tower performance from any known operating point. Eight pages, six figures, (*"Refrigerating Engineering," December* 1956, *page* 35.)

Dissolved oxygen

This paper describes a colorimetric method for determining dissolved oxygen through the use of a spectrophotometer. Five pages, three figures, four references, (*"Sewage and Industrial Wastes," December* 1956, *page* 1461.)

Glass heat exchangers

This description of the world's largest system of glass heat exchangers (in a thread plant in North Carolina) includes principles, equipment, and design features. Two pages, two photographs. (*"Southern Power and Industry," December* 1956, *page* 48.)

Platinum metals

Chemical engineers find platinum, as a material of construction and as a catalyst, to be far more useful than osmium and iridium of the heavy triad, and ruthenium, rhodium, and palladium of the light triad. Industrial uses of most of the platinum metals are covered in this informative paper from England. Five pages, four figures. (*"Chemical and Process Engineering," January* 1957, *page* 11.)

Heating, piping, and air conditioning equipment

Tables and extensive graphical data that aid in design, installation, operation, and maintenance of heating, piping, and air conditioning equipment are presented for convenient reference. Eight pages, five tables, three figures. (*"Heating, Piping, and Air Conditioning," January* 1957, *page* 179.)

Glass selection

Methods of selecting and specifying glass are covered under the headings of physical and mechanical properties, available forms, design recommendations, and characteristics of specialty glass. Sixteen pages, seven tables, six figures, six references, 12 photographs. (*"Materials and Methods," November* 1956, *page* 139.)

Statistical control

Statistical control of inventories is discussed under headings of importance, functions, when to reorder stock, number-of-demands problems, size of demands, delivery time, and supplying management with costs. Solution of typical problem is given. Seven pages, three tables, eight figures, one reference. (*"Industrial Quality Control," January* 1957, *page* 7.)

abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you . . .

The dope on data!

Collection, storage, and use of data by a father-and-son team from MIT covers tables, charts, diagrams, ordinary graphs of several kinds, and nomographs. Seven pages, eight figures, three references. (*"Water and Sewage Works," January* 1957, *page* 42.)

Temperature-difference control

A magnetic amplifier control permits mixing of two liquids only when they are at the same temperature. It operates at temperatures from 50° to 650°F. Two pages, five figures. (*"Control Engineering," November* 1956, *page* 124.)

Pressure-control valves

Description of sequence, counterbalancing, unloading, and pressure-reducing valves is supplemented with details of construction, operational vagaries, circuit and drainage applications, and up-to-date information. Seven pages, 13 figures. (*"Product Engineering," January* 1957, *page* 196.)

Coral rubber

A study of properties and applications of coral rubber, a cis-1, 4 poly-isoprene, shows that it may meet the requirements for a synthetic rubber suitable for heavy-duty tires for busses and trucks. Five pages, six tables, nine figures, 12 references. (*"Mechanical Engineering," December* 1956, *page* 1098.)

Instrumentation department

Selection, training, and organization of an instrumentation department are covered under headings of responsibility to management, duties of process control engineers, and personnel. Four pages, three flow sheets. (*"ISA Journal," January* 1957, *page* 22.)

Measurement of dust

Simplified procedures for measuring dust in ducts and stacks are presented. Convenient charts facilitate pertinent calculations. Four pages, seven references. (*"Power," January* 1957, *page* 88.)

Pentaerythritol

Pentaerythritol, a polyhydric alcohol, is discussed under headings of production, raw materials, reaction conditions, recovery stages, and uses. Nine pages, four figures, 25 references. (*"Petroleum Refiner," November* 1956, *page* 171.)

Isobutane

Processes for producing isobutane are described in paper from England. Processes that involve methods of obtaining favorable low-temperature equilibria in the system n-butane-isobutane are considered. Five pages, five references. (*"Petroleum," November* 1956, *page* 393.)

Automatic programming

From MIT comes a discussion of automatic programming. Although directed here to machine tools, methods should be applicable to much effort in chemical processing industries. Six pages, two tables, two figures, two references. (*"Control Engineering," October 1956, page 65.)*

Humidity control

How cycling rate affects control of humidity is analyzed. Capacity, condensation, equilibrium conditions, and installation of equipment for necessary control are covered. Six pages, four figures, one reference. (*"Refrigerating Engineering," November* 1956, *page* 37.)

By installing packingless centrifugals to handle 93 and 98% sulfuric acid, Inspiration Consolidated Copper Co., has been able to . . .

end packing problems on acid pumping equipment

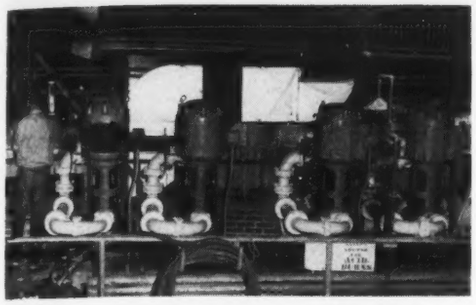
Packingless centrifugal pumps require minimum maintenance handling 93 and 98% H_2SO_4 at 60 to 85°C

THEODORE W. WETT, Assistant Editor
With **P. D. I. HONEYMAN,** Vice Pres. and Gen. Mgr.
Inspiration Consolidated Copper Co., Inspiration, Ariz.

Problem: Original acid pumping equipment at Inspiration Copper Co.'s contact sulfuric acid plant required excessive maintenance. Shaft packing could not be kept in pumps under operating conditions. A week was normal packing life, although at times it was only a matter of hours before one or more pumps required repacking.

Pumps handled sulfuric acid with a suction lift of from two to four feet, 93 and 98%, at 60 to 85°C. Flow rate was 150 gallons per minute.

Solution: Inspiration installed four packingless, self-priming centrifugal pumps in 100-ton contact sulfuric acid plant. In 1950 an additional four pumps were placed in service in second 100-ton plant constructed to meet growing plant requirements. Pumps do not have shaft packing in contact with running liquid. They are sealed in operation by a dynamic liquid seal using liquid being pumped. Drive shaft enters pump on suction



Four pumps run continuously from one plant shutdown to another, 12 to 21 months

side, and shaft seal under suction lift conditions, is thus required to work only against atmospheric pressure. This seal is never subject to and is unaffected by discharge pressure.

Pumps were installed in a vertical position and only minor piping revisions had to be made. They are driven by 1450 rpm, 10-hp, totally enclosed, fan-cooled motors operating on 440-volt, three-phase, 25-cycle current. Each unit is equipped with a four-inch discharge gate valve to regulate flow.

Maintenance overhauls on acid pumps coincide with major plant repairs which occur every year to year-and-one-half. During this period pumps are dismantled, all parts inspected for wear or corrosion, and replacements are made if necessary.

Results: Acid pump maintenance has been cut to a minimum. Pump and motor are cleaned daily and an hourly check of oil drip cup is made. Plant downtime has been materially reduced. Units operate continuously for at least a year without further attention other than daily maintenance, until they are checked during regular plant shutdown. In some cases pumps have run continuously as long as 21 months without a shutdown.

(Packingless centrifugal pumps are a product of The LaBour Co., Inc., Dept. CP, Elkhart, Ind. . . . or for more information reader may simply check 2920 on form opposite last page.)

When inquiring check 2921 opposite last page

Long surface life provided with multi-color paint . . .

finishes make it possible to spray two or more colors simultaneously in a single spray coat

Uses: As finish for metal, wood, masonite, fiberboard, and other porous and nonporous materials.

Features: Finishes make it possible to spray two or more colors simultaneously in a single spray coat. Coating resists continued scrubbing with mild alkalis or detergents; gives longer-than-average surface life before refinishing is required; resists cracking and peeling.

Description: Multi-color finishes are two phase systems, consisting of a water phase and a lacquer phase. In production, lacquer is dispersed in water phase under moderate agitation until desired particle size is obtained. This yields a lacquer suspension, a system of discrete particles visible to the naked eye. These suspensions, consisting of different colors, can then be intermixed and yet remain separate. No merging, blending, or let down of color takes place. Instead of a single resultant color, a multi-color blend results.

When sprayed, the combination can be captured on a variety of surfaces. Spraying is the only successful method for applying the multi-color finish. Care must be taken, however, to insure that paint is not too highly atomized, causing particles to break and smear as they come out of gun. Product is supplied ready for use. It dries to touch in one or two hours, and can be packed in four hours.

("PolyNam" multi-color paint is manufactured by Duralac Chemical Corp., Dept. CP, 84 Lister Ave., Newark 5, N.J. . . . or for more information check 2922 on form opposite last page.)

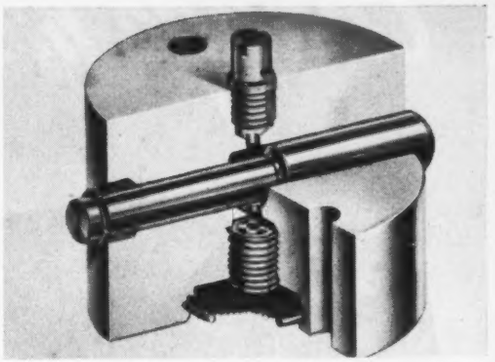
One moving part means less wear in piston pump for lubricating vertical drive shafts . . .

unit is able to feed varying amounts of oil depending on requirements

Uses: Lubrication of machines with a vertical drive shaft. Pump provides continuous lubrication of a bearing or series of bearings.

Features: Rotating pump has a single moving part, and oscillating piston, which means reduced maintenance and replacement problems. Design of unit can be adapted to different lubrication requirements.

Description: Unit consists of a cylindrical housing, about 3" in diameter, containing a horizontal stepped piston. Pump is mounted on bottom of drive shaft so that it rotates in a fixed eccentric race in a sump and ends of piston, ex-



Rotary-driven piston pump provides continuous lubrication of hard-to-reach machine elements

tending beyond diameter of housing, ride against eccentric race. Resulting oscillating action draws oil into the pump and feeds it under pressure into bore of drive shaft and thence to bearings. A bronze filter assures a clean oil supply and check valves maintain one-direction oil flow. Rate of oil flow is determined by length of piston stroke, diameter of piston, and rpm of pump housing.

(Rotary-driven piston pump is a product of Bijur Lubricating Corp., Dept. CP, 151 W. Passaic St., Rochelle Park, N.J. . . . or for more information check 2924 on form opposite last page.)

Safe, economical operation with fire-resistant hydraulic fluids . . .

no special packings or seals required

Uses: As fluids for hydraulic lines where fire hazard is present.

Features: Fluids are fire-resistant. They require no special packings or seals and are characterized by good shear stability, high viscosity indexes, and low pour points.

Description: Ucon hydrolubes 150-CP and 275-CP are aqueous-base, safety hydraulic fluids. Typical properties are:

	150-CP	275-CP
Viscosity, SUS		
at 150°F	78	124
at 100°F	150	275
at 0°F	2100	4100
Specific gravity, 20/20° C	1.079	1.080
pH	9.7	9.7
Pour point, °F	—40	—25
Viscosity index	165	155
ASTM rust test	pass	pass
Alkaline content*	165	165

*ml 0.1N HCl to neutralize 100 ml of fluid to pH of 5.5

(Ucon 150-CP and 275-CP are products of Carbide and Carbon Chemicals Co., Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check 2925 on form opposite last page.)

Details mechanical seal

Bulletin of ten pages gives details on construction, lubrication, and maintenance of mechanical seals. Cutaway views and numbered line drawings are used.

Bul 10 is available from Sealol Corp., Dept. CP, Warwick Industrial Park, Providence 5, R.I. When inquiring specify 2926 opposite last page.

Full penetration weld results with branch pipe fitting

Uses: Units act as 45° directional flow branches, thermowell connections, pipe support, and hanger connections.

Features: Branch welding pipe fitting is constructed to provide a full penetration weld where fitting joins pipe.

Forms 45° directional flow branch

Description: Drop forged fittings are available from stock in the following materials: carbon steel, stainless steel, and chrome moly alloy. Sizes from ¼" through 3⅜" are available with threaded and socket-weld ends.

(Elbolets are a product of Fittings Div., Bonney Forge & Tool Works, Dept. CP, Allentown, Pa. Check 2927 opposite last page.)

For more information on product at left, specify 2928 . . . see information request blank opposite last page.

Lowers maintenance costs, prevents unnecessary loss of product . . .

rupture disc provides accurate pressure relief for protection of tank cars

Uses: Rupture disc provides a relief opening through tank car safety vents in case of excessive pressures.

Features: Discs provide accurate rupture pressures. This eliminates erratic performance and unnecessary disc failures thereby lowering tank car maintenance costs. Delays in transit and possible loss of valuable products are eliminated.

Slotted Inconel disc and flat Teflon seal control rupturing action of disc

Description: Model TC rupture disc has two members that control rupturing action: prebulged, slotted Inconel disc and flat Teflon seal. Teflon isolates Inconel from contents of tank and provides a pressure seal for disc assembly. A centering ring constructed of stainless steel insures accurate alignment of disc when installed. A vacuum support is built into disc assembly to prevent collapse during periods of vacuum, or as a shock absorber when there is movement of liquid during transit. Disc is adaptable to either standard bolted or threaded tank car fittings. It is available in 30 and 45 psig relief pressures.

(Model TC rupture disc is product of Black, Sivalls & Bryson, Inc., Dept. CP, 7500 East Twelfth Street, Kansas City 26, Mo. . . . or for more information about manufacturer's product reader may simply check 2929 on form which is located opposite last page.)

Your guide . . . to more engineering & maintenance developments is the alphabetical product directory beginning on page 257

Reduce vacuum line leakage with pliable coating for gaskets . . .

material remains non-hardening in service, joints can be easily dismantled

Uses: Adding a film or coating to flange faces and gasket surfaces to reduce vacuum line leakage.

Features: Non-hardening gasket material replaces cut gaskets in many installations, reduces vacuum line leakage to a minimum. Flanges are easy to dismantle even after years of service.

Gasket material can be used alone or to extend service of cut gaskets

Description: Material is compounded from a non-volatile, non-drying agent and contains graphite. It is available in two formulations; one for air, steam, water, mild chemicals; another for gasoline, oil, solvents, and similar materials. Material can be applied with spatula, putty knife, or by hand.

(Plastic gasket is a product of Flexrock Co., 3611 Filbert Street, Philadelphia 1, Pa. . . . or for more information check 2932 on form opp. last page.)

Lightweight, low-cost insulation made of foamed plastic . . .

has k factor of 0.24 at 60°F mean temperature, average modulus of rupture of 24 psi

Uses: As insulation for use under concrete floors; as free-standing walls in cold rooms; walls and floors of refrigerated trucks and trailers.

Features: Material combines light weight and moderate cost with relatively high compressive strength and high insulating efficiency. Board may be used at −50 to 160°F. It has k factor of 0.24

at 60°F mean temperature, with an average modulus of rupture of 24 psi.

Description: Insulation board is applied by cold erection method, using an adhesive, with additional support supplied in cold rooms by hardwood skewers or galvanized nails. Multiple layer construction is recommended by manufacturer.

Lightweight (1.25 lb/cu ft) foamed plastic insulation board is easy to install by cold erection method

Structurally stable and odorless, insulation is available in boards from 2 to 4" thick in 12 x 36" size for cold rooms, and in 36 x 36" size for refrigerated truck and trailer bodies. Weight 1.25 lb/cu ft.

(Rigid, foamed-plastic insulation board is product of Armstrong Cork Company, Dept. CP, Liberty & Charlotte Sts., Lancaster, Pa. . . . or for more information check 2934 opp. last page.)

"Oh no! Not again this year!"

When inquiring check 2936 opposite last page

Compact DC power source at Argonne National Laboratory uses germanium rectifiers . . .

Expected reliability and compactness were deciding factors that led Argonne National Laboratory, Lemont, Illinois, to specify germanium rectifiers for 30,000 amp DC power supply. Electromagnetic pumps handling liquid sodium for atomic reactor development program require approximately 120 amp DC for every gpm pumped, depending on pressure head developed. Current laboratory work includes a 250 gpm pump . . . with power requirements reaching 30,000 amp at 1.5 volts DC. Future power reactor requirements may go to over 250,000 amp. Germanium rectifier, being installed to supplement units that are supplying power, will occupy about 1/3 the space with equivalent saving expected on larger installations.

Germanium rectifiers have an efficiency approaching 98.5% for junctions alone. Circuits using these elements, therefore, operate very close to theoretical values for an ideal rectifier.

Rectification is accomplished in a single crystal which does not change with age or storage. Life is believed to be unlimited. In tests, no measurable increase in forward voltage drop or reverse current has been noted after 24,000 hours of continuous operation. This is equivalent to 3000 work-

Germanium rectifiers require only a fraction of space occupied by equivalent units

Efficient, 30,000-amp unit occupies fraction of space required by equivalent power source

ing days (about 10 years) of operation at eight hours per day. In addition, no reforming is required after extended periods of non-operation.

Cooling requirements are low, so connections and ducting take up little space. For air cooling, volume recommended is 75 to 250 cfm at a static pressure drop of 0.75 to 1.0 inches of water. Liquid cooling flow rate for water is approximately three gpm. For trichlorethylene and butyl alcohol rate depends on specific heat, thermal conductivity, and viscosity.

By proper circuit design, germanium power rectifier equipment may be produced to deliver up to 250,000 amp or more, at up to 300 volts DC with large savings in size and weight over other metallic retifiers.

(Germanium rectifiers are produced by International Rectifier Corp., Dept CP, 1521 E. Grand Ave., El Segundo, Calif. . . . or for more information check 2937 on form opposite last page.)

(DC power unit using germanium rectifiers was supplied by A. O. Smith Corp., Dept CP, Milwaukee 1, Wisc. . . . or for more information check 2938 on form opposite last page.)

Hydraulic fluid developed for use above 150°F . . .

has high boiling point, low volatility, and good fire resistance

Uses: Developed as fire-resistant hydraulic fluid for systems operating at temperatures above 150°F, and for heavily loaded pumps and bearings.

Features: Fluid has very high boiling point, low volatility, good fire resistance, and is resistant to hydrolysis. Additive fortification insures protection against rust and foaming.

Description: Houghto-Safe 1020 is non-aqueous phosphate ester fluid, fortified with special additive treatment. Physical properties are:

Viscosity, SUS at 100°F	229
Fire point	670°F
Flash point	485°F
Autoignition point	Over 1200°F
Specific gravity 60°/60°F	1.15
Volatility at 210°F, 24 hr	0.16%
Hydrolysis, 16 hr with boiling water	0.003%
Rust test, ASTM	Passes

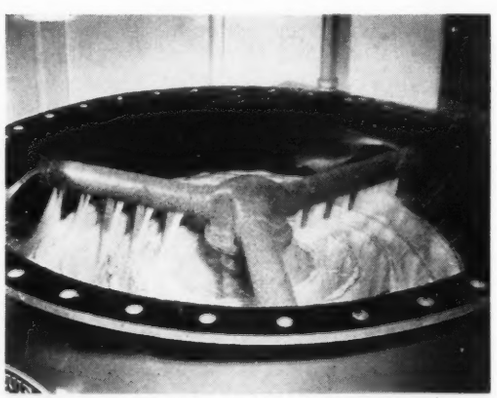
(Houghto-Safe 1020 is product of E.F. Houghton & Co., Dept. CP, 303 W. Lehigh Ave., Philadelphia 33, Pa. . . . or for more information check 2942 on the convenient Reader Service slip which is located opposite last page.)

Built-in turbo-jet backwash featured in water filter . . .

reduces amount of water needed for backwashing

Uses: Units are designed for filtering industrial and municipal water supplies, and for commercial swimming pools.

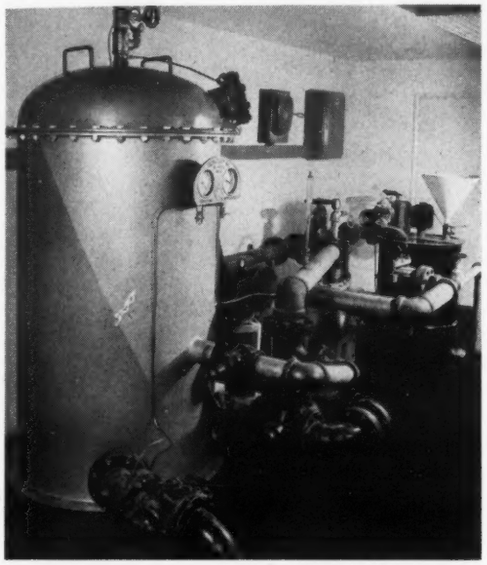
Features: Built-in turbo-jet backwashing arrangement uses less than 1/3 amount of water for



Filter has revolving turbo-jet wash-down arrangement

cleaning its elements, compared to equivalents in conventional filters. Cost of unit is about 1/3 less than conventional filter of equivalent capacity.

Description: Largest single filter is only 3′ in diameter and 6½′ high. It has flow rate of 343 gpm. Multiple units are available handling 8450 gpm. Life expectancy of filter is reported to be increased approximately 400% by elimination of



Largest filter is 3′ in diameter, can handle 343 gpm

bulky elements and use of baked-on plastic coating which reduces electrolysis in tank. Filter removes particles and impurities as small as 1 to 1.5 microns.

(Centri-Mite BF series water filters are product of Swimquip, Inc., Dept. CP, 3301 Gilman Rd., El Monte, Calif. . . . or for more information check 2945 on the Reader Service slip which is located opposite last page.)

Describes rubber parts-making facilities and operations

Manufacturer's facilities for making rubber extrusions, moldings, sheets, and die-cuttings are described in 16-page brochure. Illustrations show production operations and products. Special section is devoted to company's silicone rubber products development and manufacturing equipment.

Form GB-1-56 is issued by Industrial Rubber Products Div., Oliver Tire & Rubber Company, Dept. CP, 4341 San Pablo Ave., Oakland 8, Calif. When inquiring specify 2946 on the Reader Service slip which is located opp. last pg.

Tells features and uses of portable pumps

Line of portable self-priming, centrifugal, utility pumps is discussed in two-page bulletin. Features and specifications of pumps are given. Uses and operation are depicted in diagrams. Table lists capacities in gpm.

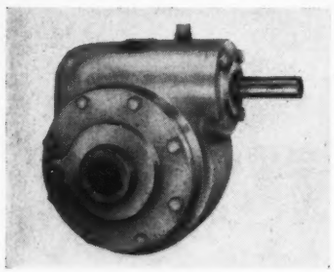
Bul 639.1, Sec X, is issued by Goulds Pumps, Inc., Dept. CP, P.O. Box 330, Seneca Falls, N.Y. When inquiring specify 2948 opposite last page.

Less space needed for shaft-mounted speed reducer . . .

eliminates cost of coupling, transmission equipment

Uses: Speed reduction in the 1/6 to 7½-hp range.

Features: Right-angle, shaft-mounted worm speed reducer can be mounted directly on shaft of given machine. Cost and maintenance of additional coupling and transmission equipment are eliminated.



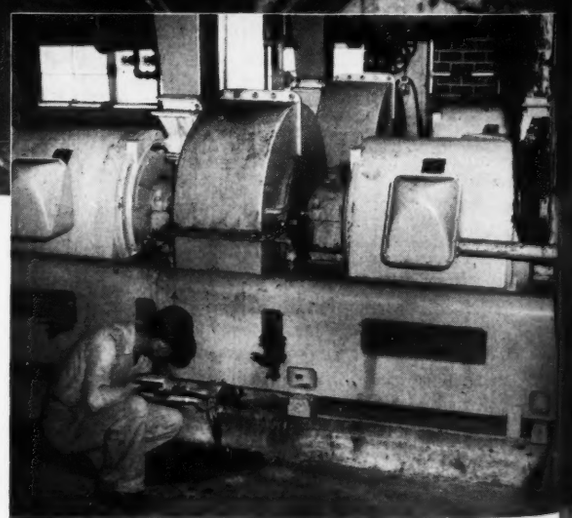
Reducer has light weight, corrosion-resistant, aluminum housing

Description: Unit has lightweight, corrosion-resistant, heat-treated aluminum alloy housing. Worms are cut on steel alloy shafts. Worm gears are made of high grade gear bronze. Reducers are offered in four basic sizes with ratios from 7.5: 1 to 96: 1.

(Shaft-mounted speed reducer is product of Electra Motors Inc., Dept. CP, Anaheim, Calif. . . . or for more information check 2949 opposite last page.)

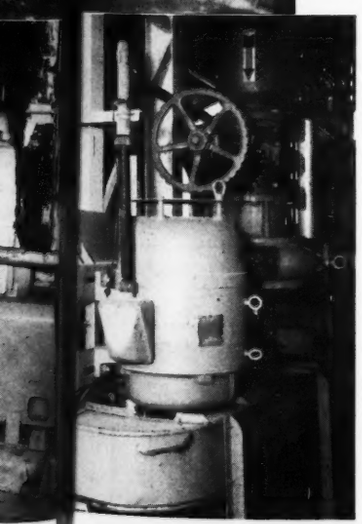
One in a series on the application of electric motors in modern industry

This washer removes fly ash from cars left in the parking lot. The 25 hp. Reliance A-c. Motor automatically starts and stops 200 to 400 times a day in all kinds of weather.

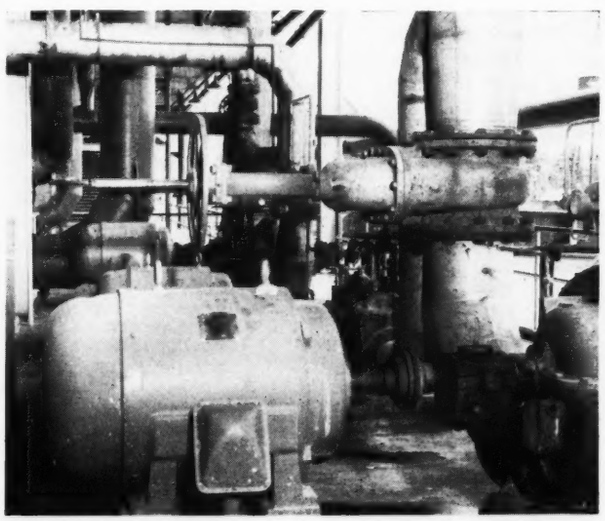


These two Bauer Refiners are driven by Reliance 400 hp. A-c. Motors. The grinding action of the machines sets up heavy load factors on the motors.

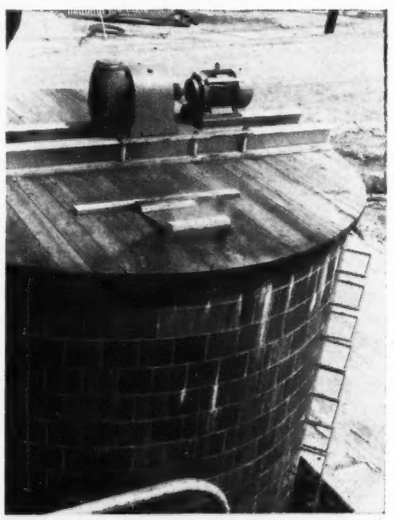
◀ Located under the head end of the board machine, this 100 hp. Reliance A-c. Motor operates a fan pump while periodically being drenched with water and pulp.



Reliance has frame designs for every application. Here is a 25 hp. foot mounted vertical motor driving a refined-stock pump. Other vertical designs include C-Face, D-Flange, and P-Base mountings.



This 60 hp., 1800 rpm and two 40 hp. 900 rpm Reliance A-c. Motors run white water pumps. Though reasonably sheltered from the elements, the motors are subjected to wide temperature changes.



In hard to reach spots like this two story high refined stock chest, Metermatic Bearing lubrication is very important. This new line 20 hp. Reliance A-c. Motor will operate the agitator for months without greasing.

Ammonia return systems shown and explained

Diagrams, with detailed step-by-step explanations, describe function of liquid ammonia return systems in refrigeration cycles. Bulletin of eight pages tells how to increase compressor efficiency, prevent compressor damage, speed defrosting, and increase peak capacity of evaporators.

Bul LRS-56 is issued by H. A. Phillips & Co., 3255 W. Carroll, Chicago 24, Ill. Specify 2950 on form which is located opposite last page.

Absorption and adsorption used in dual filter . . .

adsorbent has drying area of two million sq ft

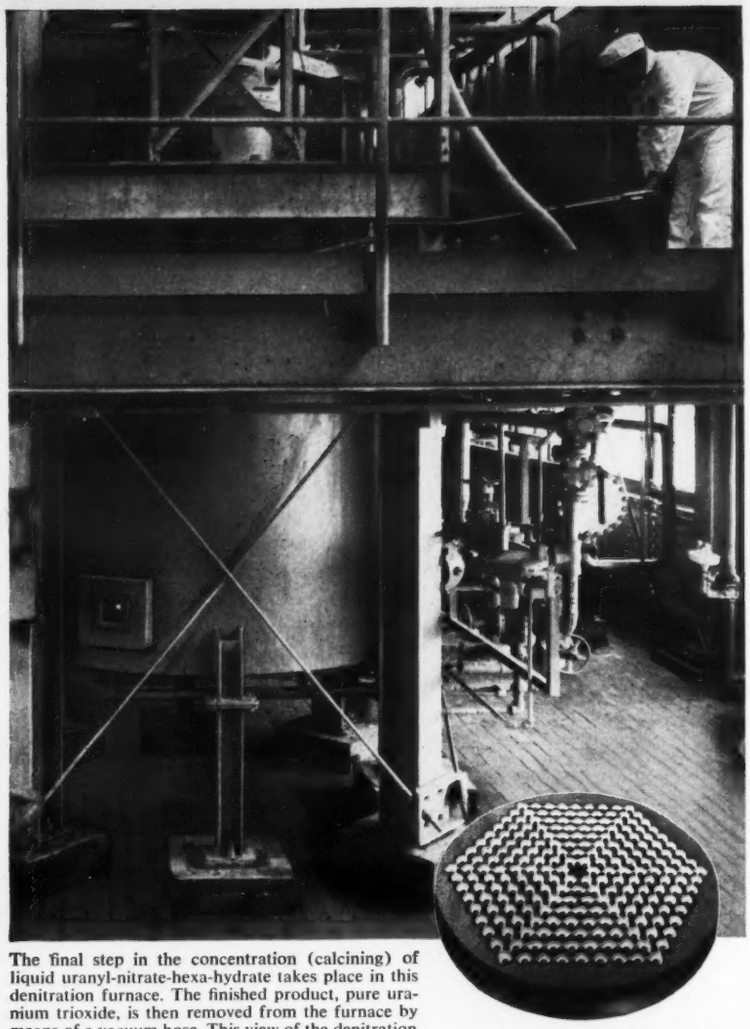
Uses: Unit is designed for removing contaminating vapors from gases which are injurious to operating mechanisms or final products.

Features: Use of both absorption and adsorption principles gives filter high rate of efficiency.

Description: Compressed air or gas being filtered travels first through conventional set of absorption pads. Then, before leaving filter housing, it rises through metal cartridge containing an adsorbent such as sova bead, activated carbon, or silica gel. Each pound of adsorbent offers effective drying area of two million sq ft. Cartridge life is approximately 150 hours.

(Duphase filter is product of Dollinger Corp., Dept. CP, 66 Centre Park, Rochester 3, N.Y. . . . or for more information check 2951 on form which is located opposite last page.)

◀ For more information on product at left, specify 2952 . . . see information request blank opposite last page.



The final step in the concentration (calcining) of liquid uranyl-nitrate-hexa-hydrate takes place in this denitration furnace. The finished product, pure uranium trioxide, is then removed from the furnace by means of a vacuum hose. This view of the denitration furnace shows both the top and bottom sections. The operator is shown removing the product.

Duradiant burner setting

Pump selection chart included in bul

Four pages of 20-page pump bulletin are devoted to a pump selection chart. Chart lists gpm, free-flow ratings, and viscosity correction factors. Two additional pages tell, in chart form, proper materials of construction when handling certain fluids. Sixty different fluids are listed.

Form W1-054 pump bul is issued by Industrial Div., The Wayne Pump Co., Dept. CP, Fort Wayne, Ind. When inquiring specify 2954 on convenient Reader Service slip located opposite last page.

Temperatures up to 400°F and pressures of 150 psi handled by hose . . .

product's entire construction is of synthetic materials

Uses: Handling air continuously at elevated temperatures and pressures.

Features: Hose is constructed entirely of synthetic materials. It will handle air at temperatures up to 400°F and working pressures of 150 psi.

Description: Hose can be supplied with inside diameters of from ¾ to 5" in lengths up to 50 ft. Strong, lightweight, flexible characteristics of product suggest many applications in industrial field.

(All-synthetic hose is a product of Quaker Rubber Div., H. K. Porter Co., Inc., Dept. CP, Philadelphia 24, Pa. . . . or for more information check 2955 on convenient Reader Service slip which is located opposite last page.)

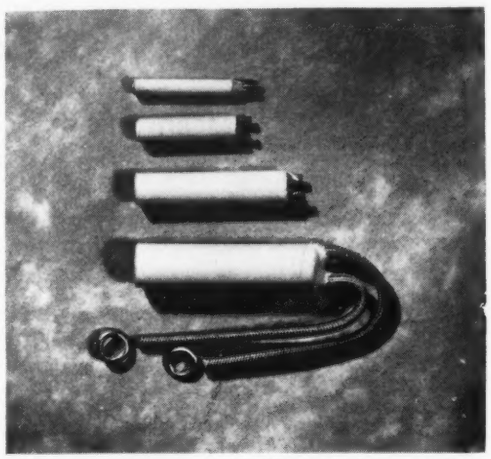
This month's Processing & Engineering Data section begins on page 82

Higher heat density provided by ceramic-body cartridges . . .

heating elements just beneath surface of unit provide faster heat transfer

Uses: Installations that require stabilized ambient temperature ranges. Cartridges are especially suited for instrumentation.

Features: Ceramic-body heating cartridges have heating elements arranged just beneath unit's



Heating cartridges are available as small as 5/32" in diameter and one inch in length

surface. This provides faster heating, higher heat densities, and minimum heat loss to the core.

Description: Cartridges are available in a complete selection of body length and diameter with units as small as 5/32" in diameter and one inch in length. Wattage ratings are available to provide densities up to 50 watts/sq in. Nickel alloy leads are swaged to rigid external terminals to facilitate quick repair of damage leads. Highest quality ceramic solidly packed with magnesium oxide is used throughout line.

(Ceramic-body heating cartridges are product of Hotwatt, Inc., Dept. CP, 16 Gould St., Danvers, Mass. Check 2957 on form opposite last page.)

Greases for shock-loaded bearings discussed in technical bulletin

Lubricants designed for use under heavy loads, shock loads, overloads, and high temperatures are discussed in single sheets. Uses, application methods, and grades are covered.

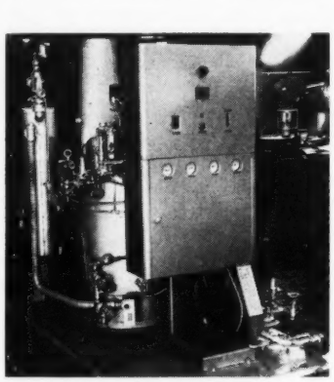
Tech Buls 49 (shock loads) and 50 (high temperatures) are issued by Sun Oil Company, Dept. CP, 1608 Walnut St., Philadelphia 3, Pa. When inquiring check 2958 opp. last page.

Steam pressure of 200 lb produced in 2 minutes from cold water . . .

generator has only 99 sq ft of heating surface

Features: Generator, with only 99 sq ft of heating surface, produces 400 to 1750 lb of steam per hr from 60°F feed water at 75 to 300 lb pressure. Unit can develop 200-lb steam pressure in two minutes from cold water.

Description: Steam generator is rated at 60 bhp. Specially-designed servo-water-by-pass control meters fuel, feed water, and combustion air, so that steam is produced at about 80% efficiency



Steam generator is about 1/4th size of conventional boilers

at all levels of output. Working steam pressure may be changed from 75 to 300 psi by turning one control. Generator is 84" long, 48" wide, and 70" high, or about one fourth size of conventional boilers of same output.

Steam separator removes excessive moisture and water treatment particles so that 99% dry, clean steam is directed through stop valve to steam line. Generator unit includes 3-hp electric motor, blower, feed-water pump, steam separator, fuel pump, and panel-mounted controls. Fuel oil, natural gas, or combination burner for oil or gas are available.

(Model 4615 steam generator is product of Vapor Heating Corp., Dept. CP, 6420 W. Howard St., Chicago 31, Ill. . . . or check 2961 on form opposite last page.)

Tells how castable refractories save money and man-hours

Bulletin of eight pages tells about series of 12 different castable refractories fulfilling various combinations of working temperature, erosion resistance, weight and strength requirement. Features are explained, and tables give data on properties, amount to use, and applications.

"Moldit Castable Refractories" is issued by Refractory and Insulation Corp., Dept. CP, 120 Wall St., New York 5, N. Y. When inquiring specify 2964 on form opposite last page.

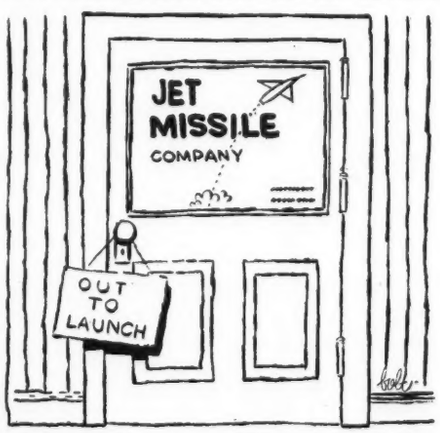
Evaporation losses retarded 75% with small polyethylene floats

Uses: Designed to reduce evaporation losses in various tanks and vessels.

Features: Floats retard evaporation losses by as much as 75 percent. They have good chemical and solvent resistance, can't be punctured or broken.

Description: Low-cost miniature polyethylene floats contain thousands of tiny air cells for buoyancy and light weight. Specially-engineered surface contours provide for extensive interlocking and clustering at surface of volatile solutions. Technical data are as follows: bulk density, 17 lb/cu ft; material density, 35 lb/cu ft equals 0.60 density; number of units per lb, 240 or 480/cu ft; nominal dimensions, ¼" thick by 1½" maximum width.

(Agile Mini-Vaps are product of American Agile Corp., Dept. CP, 5461 Dunham Road, Maple Heights, Ohio. Check 2965 opposite last page.



Idea submitted by A. A. Schilling, Research & Development Department, The Remington Arms Co., Inc., Bridgeport, Conn.

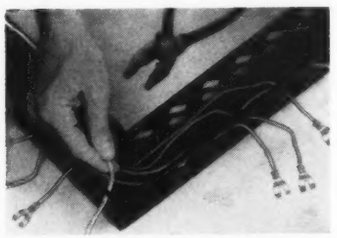
ENGINEERING

Eliminates wire bundling and lacing in grouping operations . . .

raceway permits speedy wiring with minimum labor

Uses: Design was developed to permit quick wiring of electrical and electronic equipment with pre-cut wires equipped with solderless connectors.

Features: Raceway eliminates wire bundling and lacing, and reduces labor and material loss in any wire grouping operation.



Chanel raceway speeds wiring with solderless connectors

Description: Design of raceway provides slots, instead of holes. Wires with terminals can readily be passed through slots without sacrificing structural strength of raceway. Arrangement of wire slots permits wiring to leave unit on same plane as destination terminal. Phenolic construction of unit is not affected by normal high temperatures encountered in control panels. Sizes range from 1x1″ to 4x4″.

(Panel Chanel raceway is product of Stahlin Brothers, Inc., Dept. CP, Belding, Mich. . . . check 2968 on form opposite last page.)

Shows filter's features

Eight-page brochure graphically illustrates features of automatic air filter. Two-page filter-capacity and size-selection chart is included.

Bul 175 is available from Green Fuel Economizer Co., Inc., Dept. CP, Beacon, N.Y. Specify 2969 opposite last page.

Liquid meters offer larger capacity, reduced maintenance costs, have fewer working parts . . .

crank-type rotor provides stronger control of vane positioning

Uses: Metering flow of liquids through pipes.

Features: Linkage-controlled rotor in liquid meter results in increased capacity, greater life expectancy, permanent timing, and lower maintenance costs because of fewer moving parts. Control plate and control arms have strong control of vane position to give increased capacity.

Simplicity of meter's measuring element parts makes it easier to keep them in proper timing

Description: Three models are available with flow capacities ranging from 400 to 1000 gpm. Units can be supplied in cast iron or steel with a variety of flange sizes. Inspection and repair of rotor parts is simple, and principal points of natural wear, control arm bushings, are easy and inexpensive to replace.

(Rotocycle meters with crank control are available from Meter and Valve Div., Rockwell Manufacturing Co., Dept. CP, 400 North Lexington Avenue, Pittsburgh 8, Pa. . . . or for more information check 2973 on form opposite last page.)

Rotary-gear pump catalog features viscosity data

Complete design, performance, and engineering information on manufacturer's rotary-gear pump is contained in 14-page catalog. General engineering data covering viscosities, and pipe velocities and sizes are featured. Pumps ranging from ¼ to 146 gpm are used for oils, propane, ink, asphalt, shellac, and molten lead.

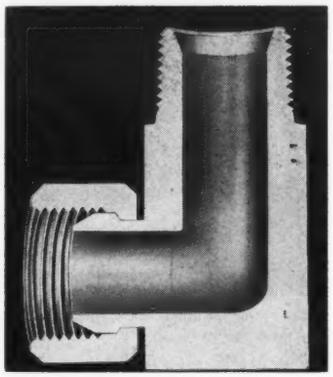
"Northern Nitralloy Pumps" is issued by Northern Ordnance Inc., Dept. CP, Columbia Heights Station, Minneapolis, Minn. When inquiring specify 2974 on form opposite last page.

Smooth radius to all angles with adapter union . . .

cuts fluid turbulence and friction

Uses: As coupling for pipes.

Features: Completely rounded inner bore of fitting provides smooth radius to all angles — minimizing turbulence and friction.



Adapter unions are available in 45 and 90° angles

Description: Male end of coupling is tapered to eliminate presence of any shoulder at juncture of adjacent fitting. Unions are available in 45 and 90° angles.

("TF adapter union is product of Eastman Mfg. Co., Dept. CP, Manitowoc, Wis. . . . or for more information check 2977 on form opposite last page.)

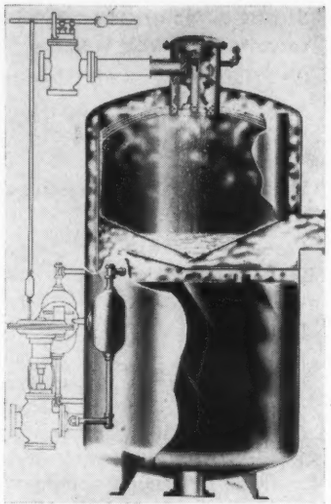
Deaerator spray head design simplifies maintenance and cleaning . . .

spray pattern is improved over all loads

Uses: Device for removing dissolved gases from steam-boiler water.

Features: Spray-head design simplifies maintenance and cleaning; improves spray pattern over all loads.

Description: Deaerators are available in capacities ranging



Deaerator features improved spray-head design

from 10,000 to two million lb/hr. Large vent opening is placed high in spray chamber, and opens directly into it. This placement eliminates dead pocket near top head. Baffling of vent discharge protects vent from water being carried out through it.

(Deaerator is product of L-A Water Softener Co., Dept. CP, 1007 Air Way, Glendale 1, Calif. . . . or for more information reader may simply check 2982 on the convenient Reader Service slip opposite last page.)

Shows typical installations of traveling-grate stoker

Operation and advantages of manufacturer's traveling-grate stoker are shown and discussed in 20-page catalog. Various installations are described. Typical heat balance table and table showing dimensions of standard stokers to meet wide variety of effective grate area requirements are also presented.

Cat 562 is issued by Johnston & Jennings Co., Dept. CP, 6917 Bessemer Ave., Cleveland 27, Ohio. . . . or for more information reader may simply check 2983 on form opposite last page.

Stroke adjustment easily changed to vary delivered volume on proportioning pump . . .

any volume of 0 to 100% of pump capacity can be obtained

Uses: Delivering an exact amount of liquid at a specified rate.

Features: Twin disc design of proportioning pump makes it easy to adjust delivered volume from 0 to 100% of pump capacity.

Description: Units are available in various plunger sizes, strokes per minute, and stroke lengths to deliver any volume from 58 to 3200 gph. Frame is plate steel. Needle bearings can be furnished for high pressure. Valve plates of solid stainless steel, Hastelloy, or other materials are available depending upon service. Valve seat assembly for inlet and discharge is easily removed.

(Design H-Model 80 proportioning pumps are product of Seter Engineering Corp., Dept. CP, 7626 W. Florist Ave., Milwaukee 16, Wis. . . . check 2986 on form opposite last page.)

"Turn it off SLOW-LY!"

When inquiring check 2985 opposite last page

When inquiring check 2987 opposite last page

Details automatic valves for liquid, gas lines

Design, function, and specifications of automatic shut-off valves for use in liquid and gas lines are detailed in four-page bulletin. Cross-sectional drawings show construction and operation.

Bul 500 is issued by Coppus Engineering Corp., Dept. CP, Worcester 10, Mass. When inquiring specify 2990 on the convenient Reader Service slip opposite last page.

Tells how to use tube fabricators

Special section in 24-page catalog tells how tube fabricating equipment is used. Equipment such as cutters, flarers, benders, etc., is described. Both hand and bench-mounted tools are included.

Cat 1140 is issued by Tube & Hose Div., Parker Appliance Co., Dept. CP, 17325 Euclid Ave., Cleveland 12, Ohio. When inquiring specify 2991 on the convenient Reader Service slip which is located opposite last page.

How to select AC motors for specific applications

Comprehensive selection data for AC motors are provided in 12-page bulletin. Data include speed-frequency relationship, NEMA design classes, torque characteristics, and frame size selection tables. Two pages are devoted to pictorial glossary of motor enclosure terminology.

Bul B-2103-1 is issued by Reliance Electric and Engineering Co., Dept. CP, 1088 Ivanhoe Rd., Cleveland 10, Ohio. When inquiring specify 2992 on the convenient Reader Service slip which is located opposite last page.

Stainless portable pump weighs only 35 lb . . .

submersible unit has capacity of over 3000 gph

Uses: For disposal of various chemicals from containers or wherever transfers of liquids are necessary.

Features: Unit is constructed entirely of 304 and 316 stainless steel. It is portable, and weighs only 35 lb.

Handy, portable, submersible pump for chemicals disposal

Description: Submersible pump measures 12" in diameter, and is 14" high. It has 1¼" discharge and capacity of over 3000 gph against heads up to 21 tdh. Motor is 1/3 hp.

(Submersible pump is product of Neptune Pump Mfg. Co., Dept. CP, 4912 N. 6th St., Philadelphia 20, Pa. . . . or for more information check 2995 on form opposite last page.)

Corrosion-resistant motor gives safe operation . . .

designed for indoor, outdoor use

Uses: For vertical pump installations.

Features: Corrosion-resistant design permits long, safe operation under adverse conditions.

Description: Motor, with normal thrust bearings in all sizes from 1 to 40 hp and high thrust in sizes from 1 to 15 hp, is avail-

able in totally-enclosed, protected, or explosion-proof enclosures. Standard enclosure for explosion-proof motor meets Underwriters' Laboratories specifications for performance under conditions covered by Class I, Group D, and Class II, Groups E, F, and G.

Motor shaft is sealed by neoprene slinger that protects bearings and windings from foreign matter. Automatic grease relief prevents bearing damage from grease pressure or over-lubrication.

(Motor is product of Reliance Electric and Engineering Co., Dept. CP, 1088 Ivanhoe Rd., Cleveland 10, Ohio . . . or for more information check 2999 on form which is located opposite last page.)

Describes jacketing system for pipes, fittings

Jacketed pipe and fittings designed to handle, in free-flowing liquid state, hot processed materials ordinarily sticky, solid, or semi-solid at atmospheric temperature are detailed in eight-page bulletin.

Bul J-57 is issued by Hetherington & Berner Inc., Dept. CP, 701-745 Kentucky Ave., Indianapolis 7, Ind. When inquiring specify 3000 on the convenient Reader Service slip opposite last page.

Photos illustrate uses of storage tanks

Numerous photographs are used to illustrate use of company's standard storage tanks in chemical, petroleum, and food industries. Booklet of 20 pages also contains engineering standards and specifications for tanks.

"Standard Storage Tanks" is issued by Graver Tank & Mfg. Co., Inc., Dept. CP, East Chicago, Ind. When inquiring specify 3001 on form opposite last page.

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc, are found throughout other sections of the magazine

Magazine for fork truck users tells money-saving story

Featured in 16-page, two-color magazine is illustrated story on how modern material handling methods saved $160,000 in one year. Publication also offers tips on buying various models of fork trucks, as well as humorous, non-related articles for general entertainment.

"Lever", winter issue, is issued by Lewis-Shepard Products, Inc., Dept. CP, Watertown 72, Mass. When inquiring specify 3004 on the convenient Reader Service slip which is located opposite last page.

Index of manufacturer's literature on instrumentation

A handy reference of literature covering process control is provided by 22-page index. Manufacturer's product catalogs and bulletins, technical bulletins, specifications sheets, industry bulletins, and instrumentation data sheets are listed. Included is a complete alphabetical index of subjects covered by articles in company magazine over past ten years.

Bul G-2-1 is issued by Industrial Division, Minneapolis-Honeywell Regulator Company, Dept. CP, Wayne and Windrim Aves., Philadelphia 44, Pa. When inquiring specify 3005 on form opposite last page.

Presents engineering data on small gas liquefier

Illustrated, six-page bulletin presents information on operation and construction of compact, single-cylinder gas liquefier. Technical details cover speed, efficiency, yield, motor characteristics, cooling water consumption, weight, and size. Liquid air applications and liquefying of gases from cylinders are discussed.

"Norelco Gas Liquefier" is issued by Instruments Div., North American Phillips Co., Inc., Dept. CP, 750 S. Fulton Ave., Mount Vernon, N.Y. When inquiring specify 3006 on the convenient Reader Service slip which is located opposite last page.

Proposal for 10 standard pallet sizes result of cooperative study

Reduction of pallet sizes from hundreds now in use to 10 standard sizes is suggested in tentative draft of proposed American Standard for Pallet Sizes. Draft resulted from prolonged study of pallets as related to transportation facilities, mechanical material handling equipment, requirements of in-plant material handling, and other factors. Study was co-sponsored by Society of Industrial Packaging, Materials Handling Engineers, and American Society of Mechanical Engineers in accordance with ASA procedures.

To obtain "Proposed American Standard Pallet Sizes" write direct to Society of Industrial Packaging and Materials Handling Engineers, Dept. CP, 111 W. Jackson Blvd., Chicago 4, Ill.

Covers variety of plug valves

Catalog of 28 pages shows 100% pipe area, venturi, round port, and diamond port lubricated plug valves. Valves in variety of metals for 150 lb steam working pressure, 200 lb oil-water-gas, and ASA 150 and 300 lb classes are included. Power operators for valves, as well as complete lines of lever-operated, and worm- and gear-operated valves are also presented.

Reference Book 39, Section 5, is issued by Homestead Valve Manufacturing Company, Dept. CP, 11 Johnson St., Coraopolis, Pa. When inquiring about manufacturer's product reader may simply check 3007 on form which is located opposite last page.

Lists rating and dimensions of conical scrubbers

Catalog of eight pages describes conical scrubbers for cleaning, disintegrating, and scrubbing ores and other materials. Operational capacities, ratings, and dimensions are listed. Installation photographs show various uses of equipment.

Bul 37-B is issued by Hardinge Co., Inc., Dept. CP, 240 Arch St., York, Pa. When inquiring specify 3008 on form which is located opposite last page.

Bulletin on drum rotator has pictures, specs

Variable-speed mobile drum rotator is subject of two-page bulletin. Features are pictured and motor and apparatus specifications are given. Unit is described as being safely and easily handled by one man.

Bul 155 is issued by Morse Manufacturing Co., Inc., Dept. CP, 727 W. Manlius St., East Syracuse, N.Y. When inquiring specify 3009 on form opposite last page.

Pigmented polystyrenes for lighting are permanent, economical

Twenty-page technical brochure gives design and fabrication data on Evenglo pigmented polystyrenes for use in lighting applications. The compound is described as being strong, lightweight, economical, permanent, and heat resistant, as well as offering unlimited color possibilities.

Bul C-6-162 is issued by Chemical Div., Koppers Co., Inc., Dept. CP, 1450 Koppers Bldg., Pittsburgh 19, Pa. When inquiring check 3010 on form opposite last page.

Answers problems of cooling water treatment and operation

Slide rule calculator quickly determines amount of make-up, evaporation rate, and inhibitor required in cooling water treatment. It also determines amount of inhibitor required to establish a certain residual, and amount of acid required to neutralize a given amount of alkalinity.

Slide rule calculator can be obtained from Wright Chemical Corp., Dept. CP, 627 W. Lake St., Chicago 6, Ill. When inquiring specify 3011 on form opposite last page.

To find what's new in chemicals

. . . turn to page 43.

Starting there is a special report listing all 1956 chemical developments.

When inquiring check 3013 opposite last page

NEW LITERATURE

Discusses applications of sequence control

Industrial uses of static control systems are discussed in 16-page booklet, illustrated with photographs, drawings, and circuit diagrams. Can be applied to blast-furnace loading, Banbury processing, conveyors, mixers, hoists, other systems and equipment.

Booklet B-6738 "Cypak Systems" is issued by Westinghouse Electric Corporation, Dept. CP, PO Box 2099, Pittsburgh 30, Pa. When inquiring specify 3014 on form opposite last page.

Proportioning pumps operate at 35,000 psi, 2000 gph

Catalog of eight pages covers proportioning pumps for pressures up to 35,000 psi and capacities to 2000 gph. Operation is discussed and design features are pointed out. Selection charts for yoke and crank arm drive and quadruplex pumps, from 2 to 4" stroke-frame, are included.

Cat HP-1254 is issued by Philadelphia Pump & Machinery Co., Dept. CP, 13500 Philmont Ave., Philadelphia 16, Pa. When inquiring specify 3015 on form opposite last page.

Viscometers for general and specific uses

Eight-page newsletter illustrates and prices line of bubble viscometers, some of which, are specified for varnish, lacquer and rubber. Viscosity readings in Stokes of each set of bubble tubes are shown in table form. Tube holders and water baths for use with these viscometers are also described.

Newsletter No. 17 is issued by Gardner Laboratory Inc., Dept. CP, PO Box 5728, Bethesda 14, Md. When inquiring specify 3016 on form opposite last page.

When inquiring check 3017 opposite last page

When inquiring check 3018 opposite last page

How to operate lift truck is subject of booklet

Two-color cartoon technique is used for presenting instructions on operation of lift trucks, preventive maintenance, safety, and basic material handling. Booklet of 24 pages is written for both beginner and experienced operator. Drawings for setting up obstacle course are included.

"How to Operate a Lift Truck" is issued by Hyster Company, Dept. CP, 2902 NE Clackamas St., Portland 8, Oregon. When inquiring specify 3021 on form which is located opposite last page.

Shows valve-bag packer with weight control

Information on automatic, controlled-weight valve-bag filling device is detailed in four-page brochure. Screw-type bag packers and bag settlers are also described and illustrated.

"Black Diamond Airflow," is issued by Black Products Company, Dept. CP, 13513 Calumet Ave., Chicago 27, Ill. When inquiring specify 3022 on form opposite last page.

Bulletin covers briquetting and spin-test machines

Six-page bulletin illustrates and details automated machines for abrasive, refractory, powder metal, and ceramic briquetting production. Spin-test machine for automatic one-at-a-time testing of abrasive cut-off saws and grinding wheels is also described. High-speed hydraulic and other presses for special metal-working applications are treated.

Bul 756 is issued by The George L. Day Co., Dept. CP, 1227-31 Niagara St., Buffalo 13, N. Y. When inquiring specify 3023 on form opposite last page.

Aid to draftsmen

Tracing templates to aid draftsmen in drawing valves are provided without charge by manufacturer. Templates, containing top, side, and front views of 24 valves, are in one-quarter, one-half, and full size.

Templates are offered by Ross Operating Valve Co., Dept. CP, 120 E. Golden Gate Ave., Detroit 3, Mich. When inquiring specify 3027 on the convenient Reader Service slip which is located opposite last page.

Nuclear power plant design described in bulletin

Description of 180,000-kw nuclear power plant to be located near Chicago, Ill., is presented in 25-page bulletin. Detailed information on reactor, turbine plant, auxiliary systems, control and operation, and safety systems is included. Design objective, selection of reactor, and system parameter considerations are discussed.

Bul GER 1301 is issued by General Electric Co., Dept. CP, One River Road, Schenectady 5, N.Y. When inquiring specify 3028 on form which is located opposite last page.

How petroleum industry uses radioactivity

Applications of nuclear techniques in research and refinery operations, new developments in instrumentation, and health physics considerations were some of the subjects covered in recently held symposium. Abstracts of speeches plus a comprehensive glossary of nuclear terminology are contained in 44-page bound booklet.

Booklet is issued by Symposium Committee, Tracerlab, Inc., Dept. CP, 130 High St., Boston 10, Mass. When inquiring specify 3029 on form opposite last page.

Thermostats function in corrosives

Specifications and applications of thermostats, dielectrically sealed in plastic, are contained in four-page illustrated brochure. Designed for temperatures of 10° to 167°F, units are resistant to acid and basic solutions, alcohols and aliphatic hydrocarbons, and highly humid atmospheres.

Bul MC-137 is issued by Fenwal, Inc., Dept. CP, Ashland, Mass. When inquiring specify 3030 on form opposite last page.

Chemical reactions of fatty alcohols

A very detailed descriptive listing of reactions of fatty alcohols is given in this 16-page book. Over 50 reactions are presented. Technical data on the unsaturated aliphatic and saturated aliphatic alcohols are given, along with the comparison of melting and boiling points of the saturated monohydric alcohols. The bibliography has 70 entries.

Bul No. 907-R is issued by Chemical Products Div., Archer-Daniels-Midland Co., Dept. CP, 700 Investors Bldg., Minneapolis 2, Minn. When inquiring specify 3032 opposite last page.

Over 400 items of electrical, mechanical equipment listed

Engineering maintenance equipment is covered in 35-page catalog that lists over 400 electrical and mechanical items. Bakelite and ceramic wire connectors, plastic clamps and straps, voltage tester, commutator resurfacers, and carbon brush seaters are among the products and equipment listed.

Cat 12 is issued by Holub Industries, Inc., Dept. CP, Sycamore, Ill. When inquiring specify 3033 on the convenient Reader Service slip which is located opposite last page.

Power transmission products cataloged

Gears, racks and pinions, miters, chains and sprockets, bushings, drives and reducers, variable-speed drives, couplings, bearings, and pulleys are cataloged in 576-page, pocket-size data book. Dimensions, weight, performance tables are given.

Cat 56 is issued by Power Transmission Equipment Co., Dept. CP, 1245 W. Fulton St., Chicago 7, Ill. When inquiring check 3034 on the convenient Reader Service slip which is located opposite last page.

Features data system for process control

Brochure of 16 pages in two colors illustrates data system for process control. System is described as "link between sensing elements and computer". Applications suggested include process monitoring for both process and pilot plant control.

Bulletin 494 "Model 111" is issued by Scientific Instruments Division, Beckman Instruments, Inc., Dept. CP, 2500 Fullerton Road, Fullerton, Calif. When inquiring specify 3035 on form opposite last page.

NEW LITERATURE

Describes hydraulic fluid with safety features

Fire-resistant hydraulic fluids are described and their physical properties given in 16-page booklet. Advantages and limitations of these water-base products are discussed. Information on their installation, use, and maintenance is included.

Booklet F-40134 is issued by Carbide and Carbon Chemicals Co., a Division of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. Specify 3036 opposite last page.

Steel-strapping machine pictured in folder

Typical applications as well as specifications of pneumatically powered and electrically controlled steel-strapping machine are shown and described in four-page folder. Machine is described as allowing steel strapping and packaging operations to keep pace with the fastest production lines.

F3 strapping machine folder is issued by Acme Steel Products Division, Acme Steel Co., Dept. CP, 135th and Perry Ave., Chicago 27, Ill. When inquiring specify 3037 opp. last page.

Volumetric flask data

Line of stoppered and unstoppered volumetric flasks is described in two-page data sheet. Capacities range from 10 to 2000 ml.

Data Sheet 4 is issued by Doerr Glass Co., Dept. CP, Vineland, N.J. When inquiring specify 3038 opp. last page.

For more information on product at left, specify 3039 . . . see information request blank opposite last page.

NEW LITERATURE

Lists metal powder data in handy form

Eight-page bulletin, punched for notebook insertion, presents description, specs, properties, and uses of metal powders. Brief description of laboratory facilities is accompanied by illustrations.

Bul 561 is issued by Metals Disintegrating Co., Inc., Dept. CP, PO Box 290, Elizabeth, N. J. When inquiring specify 3042 on form which is located opposite last page.

Corrosion-resistant processing units

Construction material combining furan resin and inert ceramic is described in four-page bulletin. Material is recommended for fabricating corrosion-resistant pipe, fittings, towers, and other processing equipment. Physical properties are listed.

"Chemplas 15" is issued by Chemical Equipment Div., General Ceramics Corp., Dept. CP, Keasbey, N.J. When inquiring specify 3043 on the convenient Reader Service slip which is located opposite last page.

Performance highlighted in pump bul

Proven performance in handling variety of corrosive and erosive fluids in industry is highlighted in eight-page bulletin on progressive-cavity pump. Engineering specifications, principles of operation, and a listing of compounds handled are included.

Bul 30-C is available from Pump Div., Robbins & Myers, Inc., Dept. CP, Springfield, Ohio. When inquiring specify 3044 on form which is located opposite last page.

NEW LITERATURE

Latex products, chemicals

Products for making latices for use in coatings, adhesives, dipping, and foams are discussed in this eight-page booklet. Stabilizers, accelerators, short stops are included in this product bulletin from Alco Oil & Chemical Corp., Dept. CP, Trenton Ave. and Williams St., Philadelphia 34, Pa. Check 3047 on form opposite last page.

Catalog features extractor for difficult operations

Extractor, especially well suited for use with highly water-soluble compounds with as many as four hydroxyl groups, is featured in 12-page catalog. Other laboratory equipment described and illustrated includes gas chromatograph, electric desalter, relative humidity chamber, and portable cooling unit.

"New and Recent Devices" is issued by Aloe Scientific Div., A. S. Aloe Company, Dept. CP, 5655 Kingsbury, St. Louis 12, Mo. Specify 3048 on form opposite last page.

Flow colorimetry in industry

Flow diagrams and detailed description review some practical applications of flow colorimetry. Some examples given in eight-page technical article are color grading of refined vegetable oils; continuously recording Saybolt color of kerosene, naphthas, and paraffin waxes; control of chlorine dioxide in paper mills; measuring hexavalent chromium in plating rinse water; and monitoring turbidity.

Reprint R-85 is issued by Scientific Instruments Division, Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. When inquiring specify 3049 on form opposite last page.

Report tells how to estimate costs of graphite processing equipment

Information designed to help in cost estimation and selection of manufacturer's impervious graphite processing equipment is presented in 32-page report. Detailed cost data are furnished for heat exchangers, cascade coolers, HCl absorbers, towers, centrifugal pumps, rupture discs, pipe, fittings, and valves. Chart of chemical resistances with brief outline of properties and characteristics of manufacturer's impervious graphite is included.

"Data for Cost Estimation" may be obtained on letterhead request to Falls Industries, Inc., Dept. CP, Aurora Road, Solon, Ohio.

Data bulletin on ethylene oxide includes vast bibliography

Analytical procedures, physical and chemical properties, and industrial uses of ethylene oxide are in 44-page technical bulletin. Along with ten graphs of physical properties, data are included on handling techniques and toxicity, as well as specifications. Bibliography listing 489 references is also given.

"Ethylene Oxide" is issued by Jefferson Chemical Co., Inc., Dept. CP, PO Box 303, Houston 1, Texas. Check 3052 opposite last page.

"You go on to London for the power conference. I'll skip over to the Riviera and beat the bushes for new business."

NEW LITERATURE

Details company's full line of alkalis and chemicals

Informative data on uses, markets, physical and chemical properties, packaging, handling and storage of company's full line of alkalis and chemicals are contained in digest-size 67-page book. Listing groups products according to consuming industries or manufacturing processes. Photographs show various plant facilities and operations.

"Products Book" is issued by Solvay Process Div., Allied Chemical & Dye Corp., Dept. CP, 61 Broadway, New York 6, N.Y. When inquiring specify 3055 opposite last page.

X-ray spectrography data given in wall-chart form

Revised 17½ x 22½" X-ray spectrograph chart shows secondary X-ray beams for elements from magnesium to californium. K alpha and K beta lines are given for these analyzing crystals: EDDT, ADP, topaz, lithium fluoride, and rock salt. L $alpha_1$ and L $beta_1$ lines, first and second orders, for rock salt are included. Horizontal scales show two theta angles in degree and wavelengths in Angstroms for all elements under various operating conditions.

X-ray spectrograph chart, 5th Edition (1956), is available from Instruments Division, North American Philips Company, Inc., Dept. CP, 750 S. Fulton Ave., Mount Vernon, N.Y. When inquiring specify 3056 on form opposite last page.

Discusses nuclear engineering services and facilities

Nuclear measurements, analyses, testing, consulting, design, research and development services are discussed in 24-page brochure. Illustrations show laboratory equipment and facilities for various services offered. Reproduction of four-color painting on cover showing Admiral Nelson's flagship alongside the atomic powered submarine Nautilus symbolizes the progress science has made during the intervening period.

Engineering services brochure is issued by Nuclear Science and Enigneering Corp., Dept. CP, PO Box 10901, Pittsburgh 36, Pa. . . . or check 3058 on form opposite last page.

Describes over 375 products of chemical manufacturer

More than 375 basic industrial, agricultural, and pharmaceutical chemicals are contained in manufacturer's 40-page, indexed catalog. Detailed descriptive information is presented in tabular form. Included are coating materials, flotation and flocculating agents, glycols and glycol ethers, halogenated organic compounds, ion exchange resins, magnesium alloys, Methocel, organic chelating agents, inorganic and organic acids, plastics and titanium, and other organic and inorganic compounds.

Product catalog is issued by Technical Service and Development, Dow Chemical Company, Dept. CP, Midland, Mich. When inquiring specify 3059 on form opposite last page.

Helps executives keep up-to-date on management developments

Importance of operations research as a tool for problem solving and decision making is stressed in 111-page report. Avoiding excessive mathematical formulas and technical jargon, report defines terms, describes method, points to problem areas, and looks ahead to new developments and applications. Report shows how research is used in various industries and gives a good basic approach to this technical subject.

To obtain Special Report 13, "Operations Research: A Basic Approach", remit $3.75 ($2.50 for members) direct to American Management Association, Dept. CP, 1515 Broadway, Times Square, New York 36, N.Y. When inquiring specify 3060 on form which is located opposite last page.

NEW LITERATURE

Cylinders, hydrometer jar, subjects of bulletin

Cylinders and hydrometer jars are shown in another of a continuing series of data sheets on laboratory glassware. Illustrations and tables of capacities and dimensions accompany description of each item.

Data Sheet 5 is issued by Doerr Glass Co., Dept. CP, Vineland, N.J. When inquiring specify 3064 on form opposite last page.

Outlines control system of four components

Featuring a control system of four basic interchangeable components, bulletin of four pages outlines theory of operation. System described is said to be adaptable to wide variety of measurement and control including pH, tachometer, thermocouple, electrical quantities.

Bul No. F-403 is issued by Fielden Instrument Division, Robertshaw-Fulton Controls Company, Dept. CP, 2920 N. Fourth St., Philadelphia 33, Pa. When inquiring specify 3065 on form opposite last page.

Process makes parts rust resistant

Reprint of four pages gives detailed technical information on typical applications of ductile and hard case produced by process in which chromium is diffused into surface of steel parts. Tables show types of base steels used, properties created by process, and how special features solved wear and corrosion problems or lowered costs.

Bul 20 is issued by Chromalloy Corp., Dept. CP, 450 Tarrytown Rd., White Plains, N. Y. When inquiring specify 3066 on form which is located opposite last page.

alphabetical index on page 257

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 257. "Quick-locator" starting on that page was a feature in **CHEMICAL PROCESSING** years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

Manual explains functions of motor control

Operation and application manual of 32 pages covers control devices for electric motors. Motor control — what it is, how it works, what controlling devices are available and where to use them — is explained. Manual, magnetic, and reduced-voltage starters; pushbuttons; relays; limit switches; solenoids; pressure and vacuum, float, and plugging and anti-plugging switches are discussed. All equipment is well-illustrated.

GEA-6372 is issued by General Electric Company, Dept. CP, Schenectady 5, N.Y. When inquiring specify 3068 opposite last page.

Physical, electrical data on epoxy resins

Fold-out chart, 11 × 21½", gives physical and electrical data on 27 formulated epoxy resin systems. Included are room-temp set, heat-cured, filled, unfilled, resilient, and rigid resins. Properties with different hardeners are given.

Epocast Resin Chart EP-56-49 is issued by Furane Plastics, Inc., Dept. CP, 4516 Brazil Street, Los Angeles 39, Calif. When inquiring check 3069 on the convenient Reader Service slip which is located opposite last page.

Tells facts about man-made rubber

Information on physical properties and processing of man-made "natural" rubber, including step-by-step pictures of production process, is contained in 26-page booklet. Charts give analysis of properties of "cold" non-oil polymers, "cold" oil-extended polymers, and "hot" polymers. Test recipes and test data are also included.

"Ameripol Rubber" is issued by Goodrich-Gulf Chemicals, Inc., Dept. CP, 3121 Euclid Ave., Cleveland 15, Ohio. When inquiring specify 3070 on form opposite last page.

Silicone products reference guide

Almost 150 silicone products are described in manufacturer's 12-page catalog. Products, grouped by usage, include water repellents, silicone rubber, dielectrics, paint vehicles, lubricants, fluids, and defoamers.

"Silicone products 1957" is issued by Dow Corning Corp., Dept. CP, Midland, Mich. Specify 3071 opposite last page.

NEW LITERATURE

Data on corrosion-resistant plastic pipe, accessories

Bulletin of eight pages presents data on unplasticized rigid polyvinyl chloride pipe. Properties, chemical resistance, and data on sizes, pressures, dimensions, and prices for pipe, fittings, and valves from ½ to 2" are included. Instructions for threading, forming, and other installation operations are given.

Bul CE-56 is issued by American Hard Rubber Co., Dept. CP, 93 Worth St., New York 13, N.Y. When inquiring specify 3075 on form opposite last page.

Has tables of capacity for metering pumps

Including specifications on metering and proportioning pumps, 16-page catalog in two colors has tables of capacity. Schematic diagram of manufacturer's pump for precision metering is also included in booklet.

Cat 9G-56 is issued by Hills-McCanna Company, Dept. CP, 2370 W. Nelson St., Chicago, Ill. When inquiring specify 3076 on form opp. last page.

Tells role of plastics in packaging

Booklet of 12 pages shows in words and pictures how polyethylene, styrene, vinyl and phenolic plastics are applied in packaging techniques. Several pages are given to use of plastics as adhesives, coatings, laminations, and molded and extruded containers — as well as signs, displays, and packages made of vinyl sheet.

"1957 Guide to Improved Packaging" is issued by Bakelite Co., a Division of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring specify 3077 opposite last page.

Rare organics available

Five-page listing is indicative of the many rare chemicals available through this concern for use in industry and research. This list should be of help to those "plagued with the job of tracking down suppliers of chemicals with esoteric Geneva nomenclature."

Fall 1956 List is available from Chemicals Procurement Co., Dept. CP, 550 Fifth Ave., New York 36, N. Y. When inquiring check 3082 on form opposite last page.

Voltmeters, ammeters — accuracy above 0.25%

Eight-page catalog reports line of DC milliammeters, millivoltmeters, and voltmeters providing accuracy of better than 0.25%. Meters are equipped with light beam pointer. Two pages are devoted to listing of scales and ranges available.

Catalog is issued by Greibach Instruments Corporation, Gulton Industries, Dept. CP, 212 Durham Ave., Metuchen, N. J. When inquiring specify 3083 on convenient Reader Service slip opposite last page.

Shows various set-ups of weighing systems

Practically every possible arrangement of company's tank and bin weighing systems is described in illustrated 12-page bulletin. Covered in detail is line of hydraulic cells used and the various indicating, controlling, and recording instruments available for these systems.

Bulletin 561 is issued by The A.H. Emery Co., Dept. CP, New Canaan, Conn. When inquiring specify 3084 on the convenient Reader Service slip opposite last page.

NEW LITERATURE

Electric fork truck facts and figures

Four-page folder has illustrations and detailed specifications on two electric fork truck models. For freight car and truck loading there is a 68" model, while the 83" model is designed for high tiering where headroom is unrestricted.

"Air Rights" folder is issued by The Elwell-Parker Electric Co., Dept. CP, 4205 St. Clair Ave., Cleveland 3, Ohio. When inquiring specify 3088 on Reader Service slip opposite last page.

Concise and complete data on heteropolymolybdates

Properties, uses, classification, nomenclature, and preparation of heteropolymolybdates are covered in 15-page bulletin. Presenting concise and complete information on this large family of salts and free acids, bulletin also contains a detailed bibliography.

To obtain Bul Cdb-12 write direct to Climax Molybdenum Co., 500 Fifth Ave., New York 36, N.Y.

Small-size indicators fit graphic panels

Pressure indicators described in two-page sheet are useful where small-size circular-scale instruments are needed. The 3½" concentric-dial instruments are available with one or two pointers, and with or without loading regulator. Schematic of connection schemes is included in sheet.

Specification S1001-1 is issued by Industrial Division, Minneapolis-Honeywell Regulator Co., Dept. CP, Wayne and Windrim Aves., Philadelphia 44, Pa. When inquiring specify 3089 on the convenient Reader Service slip opposite last page.

NEW LITERATURE

Describes indicators for speed

Illustrated, two-page data sheet details features of indicators and recorders for precise measurement of rotational or linear speeds. Complete specifications of indicators are listed. Characteristics and speed ranges of both standard and explosion-resistant tachometers are tabulated.

Data Sheet ND46-27(100) is issued by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa. When inquiring specify 3094 on form opposite last page.

Data on four tertiary-alkyl primary amines

Booklet of 36 pages presents data on four tertiary-alkyl primary amines available from manufacturer. Physical and chemical properties, suggested applications, and chemical reactions for *t*-butylamine, *t*-octylamine, Primene 81-R, and Primene JM-T are defined.

"Tertiary-Alkyl Primary Amines" is issued by Rohm & Haas Co., Dept. CP, Washington Sq., Philadelphia 5, Pa. When inquiring specify 3095 on the convenient Reader Service slip opposite last page.

Automatic control finds new uses

"New Applications of Devices for Automatic Control" is subject of a six-page technical paper covering growth of analytical instruments in process control operations. Flow diagrams, photographs, and table point out examples.

Reprint R-88 is issued by Scientific Instruments Division, Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. When inquiring specify 3096 on the convenient Reader Service slip opposite last page.

NEW LITERATURE

Gives specifications on toggle switches

Single-page data sheet gives specification drawings on two rotary toggle switches. One model is a four-pole double-throw switch with 12 terminals, while the other is an eight-pole switch with 24 terminals. Characteristics, electrical ratings, and prices are included.

Data Sheet 112 is issued by Micro Switch Division, Minneapolis-Honeywell Regulator Co., Dept. CP, Freeport, Ill. When inquiring specify 3099 on convenient Reader Service slip opposite last page.

Outlines moisture control in natural gas streams

Method of controlling moisture in natural gas streams is outlined in two-page data sheet. System involves use of device which measures water content by electrolysis. Instrument has upper-limit alarm.

Data Sheet EH-67-0 is issued by Scientific Instruments Division, Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. When inquiring specify 3100 on form opposite last page.

Tells of emergency light with battery recharge

Four-page brochure describes two models of emergency lighting units equipped with an automatic battery-charge control. There are charts showing beam coverage, light intensity and protection time for planning emergency lighting installations.

Form 5926 is issued by Exide Industrial Division, The Electric Storage Battery Co., Dept. CP, Box 8109, Philadelphia 1, Pa. When inquiring specify 3101 on the convenient Reader Service slip opposite last page.

Illustrates primary elements for process control

Complete process control systems, electronic, pneumatic, or electro-pneumatic, are treated in 12-page folder that presents all of manufacturer's chemical process instruments. Loggers, scanner, recorders, and gas analyzers are also covered. Highlighted in this well-illustrated folder are primary elements for detecting changes in temperature, pH, gas concentrations, and other operating variables.

Folder ND46-700(1) is issued by Leeds & Northrup Company, Dept. CP, 4907 Stenton Ave., Philadelphia 44, Pa. When inquiring specify 3104 on form opposite last page.

Slide rule facilitates selection of multiwall bag papers

Quick-selector is designed to simplify choice of multiwall bag papers for meeting individual needs. Slide rule gives properties, description of construction, and product packaging applications of papers providing protection against grease, oil, acid, alkalis, abrasion, bacteria, insects, and moisture and water damage.

Paper selector for multiwall paper bags is issued by St. Regis Paper Co., Dept. CP, 150 E. 42nd St., N. Y. 17, N. Y. Check 3105 opp. last page.

Indicating temperature controller brochure has specs

Complete specifications on series of bulb-and-capillary indicating temperature controllers are given in illustrated four-page brochure. Choices include three temperature ranges, three bulb sizes, single or dual control circuits, and four basic switch types to meet various load needs.

Brochure MC-139 is issued by Fenwal Incorporated, Dept. CP, Ashland, Mass. When inquiring specify 3106 on form opposite last page.

NEW LITERATURE

Describes surface thermometer having high response

Surface thermometer capable of full-scale indication on a one-second surface contact is described in two-page leaflet. Instrument is illustrated in use with a close-up of dual Farhenheit and Centigrade scales linearly calibrated from 0 to 650°F. Leaflet also describes other scales that are available — 0-430°F and 0-1000°F.

Detailed cross-section drawing of low-thermal-load tip, outline drawing of instrument, and list of specifications and features are included.

Form 2P756 is issued by Royco Instruments, Dept. CP, 755 Arthur St., Albany, Calif. Check 3110 opposite last page.

Simplifies evaluation of photometric data

Two-page bulletin shows calculator for evaluating photometric data from spectrographic films and plates. Features that simplify plotting of emulsion calibration curves are highlighted.

Bul SCB 10-56 is issued by Jarrell-Ash Co., Dept. CP, 26 Farwell St., Newtonville 60, Mass. When inquiring specify 3111 opposite last page.

Electron-beam generators discussed in bulletin

Bulletin of two pages tells about one- and two-million volt electron-beam generators featuring resonant transformer design. Low investment and operating cost and other advantages of unit are pointed out.

Pub 8A-3729 is issued by X-ray Department, General Electric Co., Dept. CP, One River Road, Milwaukee 1, Wis. Check 3112 opposite last page.

Thermocouple components for speedy connection

Description of thermocouple components for speedy connection is contained in four-page specification sheet. Construction and dimensions of jack and plug components are detailed. All components are fully illustrated.

Specification Sheet S 005-1 is issued by Minneapolis-Honeywell Regulator Company, Dept. CP, Wayne and Windrim Aves., Philadelphia 44, Pa. When inquiring specify 3117 on the convenient Reader Service slip which is located opposite last page.

Facts on pH meter that fits pocket

Information on pocket-size pH meter is contained in one-page bulletin. Specifications, price, and suggested uses are included.

Bul 701 is issued by Scientific Instruments Division, Beckman Instruments, Inc., Dept. CP, 2500 Fullerton Rd., Fullerton, Calif. When inquiring specify 3118 on the convenient Reader Service slip opposite last page.

Tooling requirements for chemical milling

Three optional procedures for producing templates required to chemically mill flat or formed parts in aluminum and magnesium are outlined in two-page bulletin. Chemical milling, tooling requirements and inspection template specifications are included.

Bul 3 is issued by United States Chemical Milling Corp., Dept. CP, 1700 Rosecrans Ave., Manhattan Beach Calif. When inquiring specify 3119 on the convenient Reader Service slip which is located opposite last page.

When inquiring check 3121 opposite last page

NEW LITERATURE

Thermostatic control valve engineering specifications

An aid for design engineers and contractors in determining correct selection and installation requirements of thermostatic control valves is provided by manufacturer in 11-page handbook. Performance graphs, roughing-in diagrams, and piping layouts are shown to give complete information when working temperature control of liquids or steam.

Bul M-3 is issued by Lawler Automatic Controls, Inc., Dept. CP, 453 N. Mac Questen Parkway, Mount Vernon, N. Y. When inquirin specify 3122 on form opposite last page.

Handy booklet lists and defines basic nuclear reactors

Various nuclear reactor types and how they compare or differ is explained in handy eight-page booklet. Booklet names basic reactor classifications, tells how classification was determined, and defines essential features of each.

"Nuclear Reactors — a Basic Guide" is issued by Industrial Division, Minneapolis-Honeywell Regulator Co., Dept. CP, 4493 Wayne and Windrim Aves., Philadelphia 44, Pa. When inquiring specify 3123 opposite last page.

WANTED:

BUDDING CARTOONISTS!

CHEMICAL PROCESSING is in the market for cartoons (and cartoon ideas). They should touch on some aspect of chemical plant or lab work.

Worth $10—Cartoons in black ink on 8½ x 11" sheets—ready to reproduce—will be bought for *$10*, paid on acceptance.

Worth $5—Cartoon *ideas* . . . a written description or rough sketch of scene, and a caption . . . worth *$5*, on acceptance.

Send your gag material to:

Cartoon Editor, CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

Be sure to include your name, position, company, and address.

When inquiring check 3124 opposite last page

Dependable constant speed with synchronous motor

Four-page bulletin provides data on synchronous induction motor. Motor gives dependable constant speed, simplicity of operation, and low first cost in variety of industrial applications requiring a maximum of 40 hp. Features of motor and some of typical applications are discussed. Bulletin outlines information needed to obtain final specifications and quotations.

Bul 51B844OA is issued by Allis-Chalmers Manufacturing Company, Dept. CP, 1151 S. 70th St., Milwaukee 1, Wis. When inquiring specify 3126 on form opposite last page.

Describes infrared analyzers for monitoring furnaces

Infrared equipment to monitor CO, CO_2 or CH_4 content of metallurgical atmospheres is covered in eight-page folder. Illustrations of typical chart records and schematic diagrams of typical applications are included.

Folder N-91-620(1) is issued by Leeds & Northrup Company, Dept. CP, 4934 Stenton Ave., Philadelphia 44, Pa. When inquiring specify 3127 on form opposite last page.

Open type bagging scale is subject of bulletin

Construction, operating rates, and economy features of multi-purpose open type bagging scale are topics discussed in two-color, six-page bulletin. Three photographs and seven drawings accompany description of the apparatus.

Bul 0256 is issued by Richardson Scale Co., Dept. CP, Van Houten Ave., Clifton, N.J. Specify 3128 on form opposite last page.

Tells about low cost resins that make quality coatings

Sixteen-page technical bulletin is packed with formulations, specifications, and data about three heat-reactive resins which make low cost, fast drying varnishes that have good light stability. Other successful uses that are described include concrete-curing compounds, printing inks, and rubber compounds.

"LX-685 the Versatile Resin" is issued by Neville Chemical Co., Dept. CP, Neville Island, Pittsburgh 25, Pa. When inquiring check 3129 on form opposite last page.

When inquiring check 3131 opposite last page

NEW LITERATURE

Presents pushbutton switch with three-color lights

Designed for use in complex console panels, pushbutton switch lights up in three different colors and provides double-throw double-pole switching function. Description of assembly featuring a pre-wired connector plug is given in one-page illustrated data sheet.

Data Sheet 110 is issued by Micro Switch Division, Minneapolis-Honeywell Regulator Co., Dept. CP, Freeport, Ill. When inquiring reader may simply specify 3132 on the convenient Reader Service slip which is located opposite last page.

All about bulk-storing of PVAc emulsions

Four-page technical bulletin, discussing bulk storage of polyvinyl acetate emulsions, describes storage tanks, methods of shipping, piping and valves, pumps, and installation costs. Schematic view of bulk-storage plant is included.

Technical Bul PVB-522 is issued by Colton Chemical Company, a Division of Air Reduction Co., Inc., Dept. CP, 1747 Chester Avenue, Cleveland 14, Ohio. When inquiring specify 3133 on the convenient Reader Service slip which is located opposite last page.

Revises 3 safety sheets

Three previously published safety data sheets covering trichloroethylene, ethyl ether, and phthalic anhydride have been revised. The data sheets give properties and essential information for safe handling and use of these chemicals.

Revised data sheets may be obtained for 30¢ each from the Manufacturing Chemists' Association, Inc., Dept. CP, 1625 Eye Street, NW, Washington 6, D. C.

When inquiring check 3134 opposite last page

When inquiring check 3135 opposite last page

Tells about pipe corrosion control with polyvinyl tape

Advantages of polyvinyl tape for covering and protecting pipes, valves, frames, racks and metal surfaces against corrosion above and below ground are described in eight-page illustrated booklet. Technical data, characteristics, and performance specifications help users determine applications.

"Trantex Vinyl Tapes" is issued by Johns-Manville, Dutch Brand Div., Dept. CP, 7800 S. Woodlawn Ave., Chicago 19, Ill. When inquiring reader may simply specify 3136 on form opposite last page.

Summarizes pH control in waste treatment

Technical paper of 10 pages reviews types of industries originating industrial wastes that require some form of treatment. Various processes are discussed and illustrated by flow diagrams with the prominance of pH control noted. Engineering aspects of continuous pH measurement are reviewed.

Reprint R-87 is issued by Scientific Instruments Division, Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. When inquiring specify 3137 on form opposite last page.

"This lunch-hour gambling started with a harmless little card game!"

When inquiring check 3138 opposite last page

NEW LITERATURE

Indicator serves digital systems

Specifications and description of indicator for digital systems are given in two-page illustrated data sheet. Equipped with commutator, instrument measures DC signal of transducer and converts it into form for digital presentation.

Data Sheet E-ND46(101) is issued by Leeds & Northrup Co., Dept. CP, 4934 Stenton Ave., Philadelphia 44, Pa. When inquiring specify 3140 on the convenient Reader Service slip which is located opposite last page.

Flat-belt bag conveyor has 'telescope' design

Bulletin of four pages describes and illustrates flat-belt bag conveyor with "telescope" design, which gives user choice of conveying lengths from 7 to 12'. Features are pointed out and dimensional drawings included.

Bul 0456 is issued by Richardson Scale Co., Dept. CP, Van Houten Ave., Clifton, N.J. When inquiring specify 3141 on convenient Reader Service slip which is located opposite last page.

Data on extension wire for thermocouples

Information sheet of two pages describes moisture-resistant and flexible polyvinyl-insulated thermocouple extension wire. Available in 14-, 16-, and 20-gage sizes, wires are designed for use with manufacturer's thermocouples.

Spec SOO2-1 is issued by Industrial Division, Minneapolis-Honeywell Regulator Co., Dept. CP, Wayne and Windrim Aves., Philadelphia 44, Pa. When inquiring specify 3142 on convenient Reader Service slip located opposite last page.

NEW LITERATURE

Tables of chemical kinetics, homogeneous reactions

Supplement to tables issued in 1951 contains critically evaluated compilation of available numerical data on rates and rate constants of homogeneous chemical reactions. Emphasis is placed on experimentally ascertained facts. Supplement, which has 472 pages, includes new tables, additions to published tables, and revised sheets canceling and replacing parts of present tables.

To obtain NBS Circular 510, Supplement 1, "Tables of Chemical Kinetics, Homogeneous Reactions" remit $3.25 direct to Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

Over 4000 items listed in chemical catalog

Organics, inorganic reagents, indicators, and certified biological stains are among the 4000 items listed in company's 76-page catalog. Pressure-temperature alignment chart is included.

Chemical catalog (1956 ed.) is issued by Matheson Coleman & Bell, Div. of The Matheson Co., Inc., Dept. CP, Norwood, Cincinnati 12, Ohio. When inquiring specify 3147 on form opposite last page.

Gives complete listing of steel tube fittings

Complete engineering specifications, assembly instruction, materials, finishes, and operating pressures for steel tube fittings are presented in 48-page engineering catalog.

"Steel Tube Fittings" is issued by The Weatherhead Co., Dept. CP, 128 W. Washington Blvd., Fort Wayne, Ind. When inquiring specify 3148 on form opposite last page.

NEW LITERATURE

ACI revised designation chart for cast alloys available

Latest revision of list of standard designations and chemical composition ranges for heat and corrosion-resistant cast alloys is printed on handy 8 x 9" chart. Two cast alloys of 18-8 variety, with very low carbon contents, have been added.

Revised designation chart is available from Alloy Casting Institute, Dept. CP, 114 E. 40th St., New York 16, N.Y. When inquiring specify 3152 on form opposite last page.

Describes valves for handling corrosive liquids

Manufacturer's "Y" valves for exact and rigid control of low-temperature and corrosive liquids are illustrated and detailed in four-page bulletin. Drawings show construction and operation. Features are listed, and chart presents ASA rating, type, and size data.

"Pacific 'Y' Valves" is issued by Pacific Valves, Inc., Dept. CP, 3201 Walnut Ave., Long Beach 7, Calif. When inquiring specify 3153 on form opposite last page.

Three-, four-, and five-stage vacuum boosters detailed

Both condensing and non-condensing three-, four-, and five-stage steam-jet vacuum pumps are detailed in eight-page bulletin. Applications, features, construction, and operation are covered. Tables list sizes, dimensions, and performance characteristics for three-stage units.

Bul 5H3 is issued by Schutte and Koerting Company, Dept. CP, Cornwells Heights, Bucks County, Pa. When inquiring specify 3154 on form opposite last page.

Describes line of chemicals for paint industry

Manufacturer's chemical processing specialties are described in 12-page, pocket-size booklet. Antifoaming agents, pigment dispersing agents, freeze-thaw stabilizers, thickener, viscosity stabilizer, surface-active agents, and stearates are discussed

"Chemicals for the Paint Industry" is issued by Nopco Chemical Company, Dept. CP, Logan and Davis Sts., Harrison, N. J. When inquiring specify 3155 on the convenient Reader Service slip which is located opposite last page.

Professional Status

(*Continued from page 9*)

to some chemists. This is not to say, of course, that all chemists . . . or speaking broadly, all scientists . . . are introverted, but by and large, creative people tend not to be "outgoing." All of us have heard the chemist described as one who is introverted, likes to work alone, self-centered, dreamer, visionary, creative, idealist, egotist. He needs understanding and appreciation, particularly needs fellow chemists to admire his work, abhors regimentation, and frequently is an administrative problem.

So a large part of the chemists must force themselves into outside activities. With practice they can become good at them but they do need practice.

It would be redundant to say again that society and the world at large need technical creative ability as never before. We see more and more signs of this need. We see efforts at organized creativity, "brainstorming," problem-solving without thinking, and such. The chemists are good at creating. They insist on thinking as they do but they do produce good results.

Now, if we ask the chemist to take on all of the specific things that we are recommending, are we diluting his creative chemical thinking? Are we taking time away that could be better used in doing the things that come more naturally to him In the long run, are both society and the chemist better off if he sticks to his chemistry?

My thought is simple: Let's help the real chemist keep on being a real chemist by not diverting him into channels which do not come naturally to him. We can help him do the work society needs most, the work that he's best at. And, as administrators, we can see that he gets the proper recognition and reward for it.

✦ ✦ ✦

Chemical Consumers

(*Continued from page 11*)

1. What new products do existing markets need? Their number? Potential sales volume? And share of the market?
2. What new markets would the new products create?
3. What type and size of organization would be needed to sell the products?
4. What type of service organization would be required to give the customer the help he desires? Periodic talks with customers will help define the appropriate type and degree of service.

(*Please turn to next page*)

Chemical Consumers

(*Continued from preceding page*)

One requirement of such an analysis is a glimpse of the future. Although we cannot foretell what the economic climate will be 10 or 15 years from now, we can, with certain measurements, reduce the future risk involved in bringing out a new product.

The first measurement works like this. Forget about normal economic fluctuations and test the new product against the most severe setback that past experience could lead us to expect. This measurement indicates the extremes of cyclical risk involved, and hence, helps us determine the minimum necessary profit.

The second measurement consists of a study of past events that will help determine the evolution of the economy. These events would involve basic needs of the population. For an example of how this measurement operates, go back to the years of World War II. The need for more houses that became apparent in those years forecast the post-war housing boom.

With the second measurement we hope to find what will happen. The third — trend analysis — can tell us when it will happen. This measurement is rooted in the premise that the economy follows a definite trend over the long pull. Trends may register cyclic fluctuations, but over the years they do not change quickly or capriciously.

Following this approach to the commercial development of chemicals, we can operate as effective mirrors, depicting for our research departments the needs of our consumers.

✦ ✦ ✦

Metric System

(*Continued from page* 13)

Austin H. Brown, who was director of purchasing for the company. Mr. Brown's interest was aroused because of the trading carried on by Lilly all over the world. The problems connected with buying crude drugs abroad in metric units and handling the internal records and accounts in the conventional avoirdupois system led him to consider the possibility of standardizing Lilly operations on one system. Such standardization, he felt, would benefit not only Lilly but the drug industry as a whole.

Although the merits of the metric system were recognized at that time, Lilly's actual conversion was delayed. Careful consideration indicated that a delay would allow other companies in the trade and in the fine chemicals industry to develop an

interest in the metric system.

By the time Lilly converted to metric, groundwork had been done within the industry. Some other pharmaceutical manufacturers had already converted internally, either partially or entirely. Many other firms were considering such a conversion. Lilly decided to proceed with its conversion program, believing that a substantial majority of its associates in the drug business were interested in making the switch to metric.

Lilly Makes Their Decision

Our recent conversion to metric was spearheaded by A. H. Fiske, vice-president, who was in charge of Lilly's research, development, and control functions three years ago when the decision to adopt metric was made. He visualized the benefits which would be realized by personnel in the development division who are responsible for writing and administering all of Lilly's manufacturing formulas. He felt that the decimal system, which is an integral part of the metric system of weights and measures, would save time in computing adjusted quantities for increasing or reducing batch sizes. Lilly management is convinced that by adopting the metric system the company will achieve a substantial reduction in overall operating costs. We are investing funds in this program today confident that in the future we shall obtain a return on our investment many times greater than the cost involved.

The trend to the metric system has been recognized by the committees responsible for the Pharmacopoeia and the National Formulary. In the current issues of these compendia, all official requirements are expressed — at least parenthetically — in metric equivalents.

Advantages That Are Accruing

At Eli Lilly and Company, where there are approximately 2500 different manufacturing formulas to maintain, the change to a single system of weights and measures is expected to reduce the opportunities for error by a substantial amount, providing operating economies in both time and dollars.

Accounting and purchasing procedures standardized to a single system provide our company with the opportunity to obtain an increased capacity in the use of electronic equipment for simplified computing, accounting, and record-keeping. A long-term program has been planned to take advantage of automation procedures in the writing of purchase orders, the receipt of raw materials in the warehouses, requisitions on stores, the keeping of stores records, accounting operations, invoice processing — even to the point of writing the check to pay for the raw materials.

In order to take advantage of the benefits of automation combined with electronic computers and

(Please turn to next page)

Metric System

(*Continued from preceding page*)

data-processing equipment, American industry will be employing more and more scientifically educated and technically trained personnel. The men and women trained for this work have been educated to the use of the metric system. The research scientist of today thinks, speaks, and works in metric units of measure. Most scientific literature published in the United States today uses metric units and equivalents rather than avoirdupois or apothecaries'.

Advantages of Standard Units

A straightforward program of standard units which can be used from the research stage through production offers unique advantages to the drug and fine chemicals industry, which processes raw materials in batches, in quantities varying widely from milligrams to carloads.

Internally, the reception given to the change-over within the Lilly organization, where a program of education has been necessary for all nonscientifically trained personnel, has been gratifying. An orderly conversion has been achieved by allowing four years to effect the complete change-over, by keeping all affected employes fully informed on the program, and by giving them all an opportunity to become familiar with metric units instead of plunging them without warning into an alien system.

Externally, the encouraging response of other firms in the drug industry and the outstanding co-operation of suppliers who sell raw materials to Lilly have been rewarding results of our conversion program.

What's in the Future

This is the beginning of a long-term process that will see many industries going to the metric system. As one of the pioneers, we at Lilly have found it necessary to offer training courses to acquaint our nonscientifically trained personnel with details of this system. Eventually, however, I believe the schools will find it desirable to give increased training in the metric system at elementary and high school levels to prepare students not only for industry, but also to live in this world that is placing more and more emphasis on everything scientific.

As our civilization becomes more dependent upon science, as people become better acquainted with it, and as citizens of all nations become closer knit, the day might soon come when our country — and the world — adopts a *single*, simple system of measurement . . . and the most logical one is the metric system.

+ + +

Discussed in This Issue - - -

PROCESSES, EQUIPMENT and MATERIALS

Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct . . . or turn to inside back cover and use the convenient "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

DON'T FORGET THE *OTHER* INDEX —

The index here doesn't include every chemical item that is in this issue. Approximately 625 products are listed in the special report: New Chemicals Introduced in 1956. The index to these products is on page 44.

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THAT'S INTERESTING

(*Continued from page 2*)

"One more block and this housing project will be finished, Joe!"

Homes from the sky

Homes constructed of plastic materials, funnelled from helicopters hovering over a building site, will become a reality soon. That is the prediction of Henry H. Reichhold, President of Reichhold Chemicals, Inc. Walls and foundations of plastics will be poured through hoses from aircraft fitted with equipment ordinarily used for cement mixing.

Static electricity foiled

A wall and floor tile that eliminates static electricity has been developed for use in areas where explosive vapors are present.

A non-flammable base, such as rock wool or glass fiber, is coated with a film of metal that prevents discharge of static electricity. In manufacturing process, minute discharge points are raised on metal surface, allowing harmless discharge of static.

Tile, and process for making it, are covered under US patent 2,734,007.

Inchworm

A precision machining control, the "Inchworm", can control movement of loads up to 350 pounds to positional accuracies of plus or minus 0.00005 of an inch. A four-inch-long nickel rod that shrinks under influence of an electro-magnetic field is heart of machine produced by Airborne Instruments Lab., Inc. (International Nickel Co., *Mechanical Topics*)